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Paper Men Meet to Discuss Plant Problems

Kimberly-Clark Executives Consider Various Important Industrial Questions Arising From the War — Foresters Visit Paper Institute — Funds Are Sought To Protect Forests — Other Late Mill News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., March 23, 1942—Typical problems confronting the pulp and paper industry, and methods of meeting them were set forth by four executives of Kimberly-Clark Corporation in a panel discussion before the Neenah Club at Neenah, Wis., Monday, March 16. The speakers were S. F. Shattuck, vice-president, J. C. Simonich, W. F. Cook and J. B. Schiebler.

With 325 men already in the armed forces and the total likely to reach 1,000 within the next year or so, the problem of employment is one of the pressing ones, the speakers pointed out. Job progressions make it necessary to train three to five persons at times, it was said, to fill one vacancy. More than 200 new workers have been hired within the last two and a half months. The policy is under consideration, the speakers announced, of hiring women for men's jobs where practicable, and of recruiting married women for the depleted rolls.

Measures To Protect Plants Being Taken

Plant protection is being met by hiring additional watchmen who have been given police training, and by appointment of fire wardens who have been trained by the local fire chief. Provision of identification buttons with photographs, appointment of first aid captains, provision for auxiliary lighting and issuance of emergency lanterns, and the locking of oil and lubricating storages are among the steps taken.

Employees also have been educated to the importance of salvage, and are conserving all possible materials. This includes reversal of the policy of long standing of throwing away worn parts where it was cheaper to purchase new ones.

To meet changing conditions, the company more than ever before is attempting to keep employees informed of the current status of the firm in the business world. Continuous training programs will be instigated to keep abreast of the needs.

Research and engineering departments, it was announced, are fulfilling the corporation's attitude towards all-out cooperation in the war effort by offering their services to government agencies. Machine shops are devoting 16 hours out of 24 to production of war materials.

Kimberly-Clark's new insulating material, Kimsul, it was revealed, is being used as a protection against heat and cold in cantonments in Iceland, Ireland and North Africa, demonstrating how its crepe wadding industry, born of necessity for surgical supplies in the last World War, has expanded into many fields.

Speakers also described the problems faced in shortages of material such as pulp, chlorine and other items.

Foresters Visit Paper Institute

A tour through the Institute of Paper Chemistry was one of the features of the spring meeting of the Wisconsin and Upper Michigan section of the Society of American Foresters at Appleton, Wis. Friday, March 20. Approximately 50 persons were present for the session, which included discussions on practice rules for major forest types, pulpwood procurement, woodroom operations, and new developments in the use of plywoods.

The gathering closed with a banquet at the Conway hotel at which Dr. Otto Kress, technical director of the Institute, spoke on "Trends in the Pulp and Paper Industry."

Seek Funds for Forest Protection

Marinette, County, Wisconsin, is leading a movement to provide adequate state funds for forest fire protection in 26 northern counties, now that the facilities and manpower of numerous Civilian Conservation Corps camps are no longer available. A resolution was adopted by the county board of supervisors asking that an appropriation be made from the state emergency fund to provide additional labor and equipment for adequate fire prevention and fire-fighting work.

It was pointed out in the resolution that the potential value of reforestation projects in the 26 northern counties is approximately $100,000,000 and that Marinette County alone has 400,000 acres. Natural reforestation has resulted from the minimizing of

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Canadian Paper Man Sees No Real Shortage

Head of Bathurst Power & Paper Co. Views Current Supply Situation As Due To Over-Demand With Capacity Adequate To Prevent Serious Shortage — Waste Liquor Being Studied — Other News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., March 23, 1942—R. L. Weldon, president of the Bathurst Power and Paper Company, in a report to the shareholders of his company, says that while the present situation in respect to pulp and paper has created the appearance of a shortage, his view is that it should rather be recognized as a temporary over-demand.

"Since early 1940," he says, "North America has become the source of supply for pulp and paper products required by the United Nations. Pulp and paper products are used much more freely by the peoples of the United States and Canada than by the peoples of other countries. This fact, coupled with increases in national income engendered by war, has increased the ordinary consumption of pulp and paper products in both countries substantially. Pulp and paper also enters into the production directly or indirectly of all munitions of war. The United Kingdom which formerly drew almost entirely on the Scandinavian Countries and Finland for its supplies is now dependent upon North America. Although such requirements have been reduced to the barest essentials the total is substantial.

"While this over-demand is apparently taxing the productive capacity of the industry nevertheless there is in North America ample capacity for the various kinds of pulp and paper products to meet all essential necessities required for war and for civilian life."

Waste Sulphite Liquor Being Studied

The increasing restrictions on the use of gasoline in Canada is causing renewed attention to be given to the production of motor fuel from waste sulphite liquor and waste wood. This subject is discussed at some length in a special report by Dr. Joseph L. McCarty, of the University of Washington, who is a member of the Wood Waste Committee of the Technical Section of the Canadian Pulp and Paper Association. In this report he says that because of the special demands of a war economy, the Canadian pulp and paper industry may possibly find it absolutely necessary to undertake the manufacture of ethanol from waste sulphite liquor. If this situation should arise, it has been estimated that Canada will be able to produce about 28,000,000 imperial gallons of ethanol per year. A rough estimate of the total amount of absolute ethanol (spirits) produced in Canada for industrial purposes in 1940 places it at about 2,300,000 gallons, so that the pulp and paper industry could supply many times the apparent Canadian demand for industrial purposes.

However, Dr. McCarty points out that official figures give the sale of gasoline in Canada in 1939 at 807,666,298 imperial gallons, and he says that if a gasoline-ethanol mixture containing 10% ethanol should be substituted, it is apparent that here is an outlet for about 80,000,000 gallons of ethanol, or more than three times the production estimated possible from the Canadian pulp and paper industry.

The main question to be solved is that of production cost. In theory the processing of waste sulphite liquor to ethanol should be more expensive than the processing of molasses, but Dr. McCarty says the cost of the processing steps can hardly be estimated since it will depend upon the particular equipment employed. He points out, however, that the raw material charge against waste sulphite liquor may be taken as practically zero, whereas the cost of molasses constitutes an important fraction of the total cost of ethanol therefrom.

His conclusion is that the problems remaining to be solved are economic rather than technical in nature, and that "if ethanol and other products can be economically manufactured by fermentation of waste sulphite liquor, the pulp and paper industry will have approached one step closer to the goal of profitable utilization of the whole of the wood."

Waste Paper Price Schedule Amended

WASHINGTON, D. C., March 25, 1942—Wastepaper dealers are given an additional incentive to sort their collections to segregate higher grade materials for the benefit of manufacturers by an amendment to Revised Price Schedule No. 30 on Wastepaper, announced today by Acting Price Administrator John E. Hamm.

The amendment, No. 2, eliminates the requirement that No. 1 mixed paper and old corrugated containers had to be packed in 650-pound bales in order to command ceiling prices. Dealers using smaller machine-compressed bales in packing now can sell the sorted paper for the maximum prices established in the schedule.

The amendment also requires that all sales of wastepaper must be invoiced under the grade names defined in the schedule and that delivery charges and the origin of the wastepaper be designated.

As a result of the elimination of the bale size restriction, it is expected that more paper will move through dealers equipped to sort out the higher grades, instead of direct to consuming mills who usually do not perform any sorting operations. The manufacturers have reported to OPA that the size of bales makes no material difference in their operations, which include the manufacture of writing, printing, and book paper, paperboard, wallboard and other specialty paper products.

The amendment, which becomes effective Monday, March 23, also clarifies the provisions of the previous amendment permitting dealers to add certain transportation charges, up to $1 per short ton, under certain circumstances outlined in the schedule.

Columbian Paper Co. Fifty Years Old

The Columbian Paper Company, manufacturer of soda fiber and paper, with mills at Buena Vista and Bristol, Va., is this year celebrating the fiftieth anniversary of its organization.

Chicago Reports Strong Demand for Paper

Heavy Volume of Orders Continues In Midwest For Most Kinds of Paper But Markets Are Steadier—Pool Paper Delivers Under Consideration — Salesmen's Association Announces Committees.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., March 23, 1942—Reports from paper manufacturers that production figures are now slightly off by comparison with previous months is substantiated by statements here in Chicago which indicate that a pattern is developing which helps materially to create a more calm view of the situation. All markets continue very strong and the continued heavy buying by Government agencies, plus stimulation in business not yet affected by shortages, is expected to keep the industry moving ahead rapidly in months to come. Local observers are more interested in discussing possible substitutes, new uses for paper and shifting and re-shifting from heavily reduced grades to those not so much in demand. Kraft papers continued very strong with the all around usage quality of sulphites contributing to continued active demand according to local reports. The board market was said to be good but both board and container representatives here were reporting new demands and new usages which should contribute to a most satisfactory year. Coated book papers continued to be the least responsive to the over all strength but the use of these grades as substitutes for scarce grades was lending more power to these lines as well. Waste paper markets were in better shape as salvage efforts continued unabated. The temper of the local market was more calm and the trend more interpretable, according to Chicago merchants.

Pool Deliveries Considered

Chicago paper merchants interested in the possibilities of pooled delivery plans to conserve rubber and machinery learned this week that it would be possible to develop such plans without running afoul of the Department of Justice if certain fundamentals were observed. It was learned that programs designed for the sole purpose of conserving rubber and other scarce materials used in local delivery services are not violations of the anti-trust law. Any plan that excludes competitors from the market or handicaps them in their access to it is, however, another thing and will be considered dangerously near violation of the anti-trust laws. These joint delivery systems are also not to be made the excuse for joint selling activities and the Department of Justice has advised that the merger of delivery service does not require the merger of the facilities which produce or sell the goods, the setting up of joint sales agents nor the adoption of a single brand name to replace separate brands formerly sold by business rivals. Where a restriction of delivery service contains no other feature than a plan to conserve rubber during the emergency by reducing tire mileage, the Department of Justice does not regard it as an unreasonable restraint of trade within the meaning of the anti-trust laws. With this information as presented the problem of pooling deliveries and services to conserve rubber, trucks and truck parts will be taken up with renewed interest by paper distributors servicing the trade in this area.

Study Small Business Problems

The paper and allied industry was well represented at a conference of small business men held at the Stevens Hotel in Chicago this week under the auspices of the National Small Businessmens Association. Chairman of the conference was Frederick A. Virkus of the Virkus Company, printers, while delegates included Mitchell Lee Bernstein of the National Paper Box Manufacturers Association; L. E. Parmenter and J. C. Sindelar, Sr., of the National School Supplies and Equipment Association and R. L. Lempke of the Purchasing Agents Association of Chicago which has a purchasing agents division. The conference adopted the following resolutions: to maintain the civilian economy to a maximum permitted by war requirements; compulsory registration of labor unions and business associations with financial reports required; opposition to federal licensing of business; eliminating appropriations for the St. Lawrence waterway and Florida ship canal; reduction of non-defense federal spending; placing of the Office of Civilian Defense under war department control; adoption of a 48 hour work week and abolishment of overtime pay in war industries using three shifts; opposition to new pay roll taxes; adoption of a federal sales tax to finance the war and imposition of ceilings on wages and farm prices. The conference attracted the attention of business leaders from all parts of the country and those present ordered the setting up of a committee to transmit the wishes of the conference to the Congress at Washington.

Discusses Paperboard Outlook

The paperboard industry in 1942 has a chance to equal its 1941 volume of business but its products will be of a markedly different character according to H. J. Bettendorf, editor of Official Board Markets, who spoke this week to the Purchasing Agents Association of Chicago meeting at the Hotel Sherman. The meeting as under the auspices of the Paper Group of the Association.

Announce Salesmen's Committees

Burt Fisher, new western division head of the Salesmens Association of the Paper Industry, utilized this week's Monday meeting of the Association to announce the chairmen of four important work committees. H. D. Fralich of the International Paper Company, heads the Educational Committee while the Social Committee is again to be governed by Ben K. Babbitt of the Brown Company. Joe Heyer of the Cherry River Paper Company, is in charge of the Membership Committee activities while Ray George of the Tomahaek Paper Company is chairman of the Golf Committee which will soon get into action for the five summer months. Assistant golf chairman—and the active Western division needs one—is Herman Benge of the Appleton Coated Paper Company.

Abitibi Co. Assets Ordered Sold by Court

Ontario Court of Appeals Upholds Judgment To Dispose of Assets and Property of Abitibi Power & Paper Co. — Sale Will be Completed Under Terms of Bond Mortgage — Other Industrial News.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., March 23, 1942—Ontario court of appeal, in a judgment delivered today, upheld the judgment of Mr. Justice Middleton ordering that the assets, property and undertaking of Abitibi Power and Paper Company, Ltd., in the hands of a receiver since 1932, be sold under the terms of a bond mortgage.

Mr. Justice Middleton, who heard the application of the Montreal Trust Company, trustee under the bond mortgage, had ordered the sale to take place on Feb. 18, but this was postponed by the subsequent appeal against the order. His lordship had found that the Ontario Moratorium Act, under which no sale proceedings, except under certain circumstances, could take place until December 31, 1942, was ultra vires the Ontario legislature.

The court dismissed the appeal of the liquidator of the company, R. S. McPherson, by a vote of four to one, largely on the ground that the Moratorium Act constitutes an invasion of the Dominion bankruptcy field, and is not, as contended by the appellant, legislation governing civil and property rights.

Mr. Justice Riddell, Mr. Justice Henderson, Mr. Justice Fisher and Mr. Justice Hogg held that the appeal should be dismissed, while Mr. Justice Gillanders decided that the appeal should be allowed and the order for sale set aside.

Mrs. Justice Riddell said it was clear on binding authority that in matters within its authority the legislature has powers of parliament and the powers are practically paramount, but that he felt bound to accept the conclusions of Mr. Justice Middleton that in the present case "the legislature is—no doubt with the best of intentions—interferring in matters beyond its control." He would dismiss the appeal with costs.

One-Day Newsprint Record

With reference to the annual report of Great Lakes Paper Co. printed last week, Hon. W. Earl Rowe, president and managing director, points out that newsprint production on Dec. 4, 1941, was 408.3 tons, which is believed to constitute the greatest single day's production by a two-machine plant in the history of the industry.

Several high records were established during last year's operations of the Fort William mill, which has been running at 100% capacity for both newsprint and sulphite pulp production.

Don Valley Paper Mill Flooded

Ontario experienced considerable damage as a result of what was apparently the tail end of the big blow that cut across the United States last Monday. Flood conditions prevailed in the Toronto area for some hours resulting in considerable property damage. Already swollen by the spring thaw, the Don river overflowed its banks, the worst in many years, when the heavy rain came with the terrific wind storm in the early morning hours. A foot of water covered the floor of the Don Valley Paper Co. plant and marooned Insulation Products, Ltd. The water began to recede about 11:00 a. m., however, after leaving behind inches of the brown slime peculiar to the district.

The Don Valley Paper Company had just finished a government contract the day before and the staff had been on a 24-hour basis. At 4 a.m. men at the plant telephoned Supt. M. O. Neilson as the first signs of flooding appeared. "When I got to the plant the water was just beginning to rise," Mr. Neilson said. "It didn't look bad, so I went home again. They soon called me again and when I got there the water has risen a foot. It all happened in about 15 minutes."

Mr. Neilson said the damage to the plant was "considerable." An extension is being built on the plant and the water surged around and through the unfloored addition. Duckboards were placed on the floor of the main plant and empty waste baskets floated around in the main office where the water reached the lower rungs of chairs.

In the main machine room, about 10 electric motors were under water. About 60 men and women are employed at the plant. Most of them were able to continue work as the bulk of paper stock on the premises is stored on upper floors.

OPA Defines Rag Reporting Order

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., March 25, 1942—Monthly reporting requirements of Price Schedule No. 47, Old Rags, apply only to those persons in the trade who have bought, sold, or consumed 10 short tons or more in any one month since December, 1941, the Office of Price Administration announced today.

Many of the reports received thus far by OPA have been from very small sellers of rags, indicating that the schedule's reporting provisions are not thoroughly understood in the trade.

Paragraph 1347.104 of the schedule requires purchasers or sellers of 10 short tons or more of old rags in any month after December, 1941, to keep detailed records for OPA inspection and the next paragraph, 1347.104(a), orders all such persons to file reports with OPA on or before the 10th day of each month, beginning with February 10, 1942. Sellers and brokers must report monthly inventories, purchases, and deliveries, while consumers must report monthly inventories, receipts and consumption.

As soon as the total of old rags handled in any one month reaches 10 tons, that person must file a report with OPA and continue to do so in each month thereafter, even though tonnage may drop below 10 tons in some future month.

Boston Paper Men Hold Banquet

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., March 23, 1942—The Fifty-Sixth Anniversary Banquet of the Boston Paper Trade Association, held at the Algonquin Club Thursday evening, was one of the most interesting ever, held with a specially large number present. With the retiring president Robert M. Stone in the chair, Irving N. Esleeck was elected president at the annual meeting. Other officers chosen were: First vice-president, John H. Brewer; second vice-president, James Richard Carter; treasurer, T. Charles Casey; secretary, Frank B. Cummings. Executive committee, Norman Harrower, Charles W. Fields, W. Edwin Porter, Jr. Membership committee, W. N. Stetson, Jr., chairman, Royden Loring, Matthew O. Byrne, Willard H. Loud, Hubert W. Lockhart. Arbitration committee, George W. Wheelwright, Arthur L. Hobson, Charles A. Shaw, Harry C. Thayer, Albert P. Corles. Auditor, William C. Ross.

Colonel Charles S. Proctor, chairman of the nominating committee, presented the names in his usual witty way. Other members of the nominating committee were M. O. Byrne, M. L. Madden, John W. Vivian, John E. A. Hussey. The illness of William B. McLellan was regretfully mentioned. Mr. McLellan sent his appreciation for flowers sent him.

The report of the treasurer, T. Charles Casey, showed the organization in good financial condition and noted the purchase of three $1000 Defense Bonds.

Membership Shows Growth

The report of Secretary Kilby P. Osborn showed a membership of 206, compared with 200 in 1941. Mr. Osborn was unable to be present, but his place was taken by Frank B. Cummings, who was later elected secretary.

Taps were sounded for those who had passed on during the year, Hon. Rolland H. Spaulding, former Governor of New Hampshire, and Orren C. Robertson.

Two new members were elected, James L. Madden, Hollingsworth & Whitney Company, and H. Austin Stone, Riegel & Co.

Carveth Wells Speaks

Carveth Wells, distinguished explorer, engineer and author, speaker of the evening, held the close attention of his audience throughout a hightly informative address, on "The Battle for Tin and Rubber," most attractively presented, supplemented by moving pictures of places a number of which were recently the scenes of attack by the Japanese. He preceded his talk by a brief, interesting outline of his own life. Mr. Wells is an American citizen. The colored film included Honolulu, Japan, Shanghai, Hongkong, Singapore, Kuala Lumpur, scenes along the railroad through the heart of the Malay jungle, Kelantan (now in Japanese hands), the Siamese border in Northern Malaya. In addition to discussion of rubber and tin, controlled by Japan now he included the situation regarding tungsten, hemp, quinine, mica, cocoanuts, all of which are now controlled by Japan. Other pictures shown included the Pahang Jungle, including magnificent animal pictures; Kuala Lipis across the Malay Peninsula by road to Kuala Kubu; tin mines; rubber estates; Kuala Kangsar (capital of Perak); Alor Star (capital of Kedah, now in Japanese hands); jungle dwarfs in the depths of the jungle; Penang (now in Japanese hands). Mr. Wells suggested swamping Congress with letters in regard to abolishing the 40-hour week and many other matters to assist in carrying on the war.

Among those present was M. C. Dobrow, secretary of the Writing Paper Manufacturers Association, New York.

Lindsey Cummings Leads Singing

The banquet, preceded by a reception and a general get-together, was enlivened by community singing, led by Lindsey Cummings. The menus were particularly attractive and appropriate to the times, of red, white and blue and printed in red and blue.

Those in Attendance

Those present included Leon Maglathlin, W. E. Porter, John E. Messingale, J. W. Vivian, J. Zink, Herb Fowler, Russell Madden, Holly Cantine, Henry Savage, William Ross, William C. Ross, Royal P. Teele, Gardiner Very, John Kelley, J. E. Roach, John Johnston, Jim Campbell, E. E. Ketchem, E. R. Hay, C. A. Burrell, B. M. Kimball, F. J. L. Hoss, E. J. Murphy, W. F. Erisman, Henry Heuer, Jr., Arthur W. Frank, J. J. Dwyer, R. R. White, Lewis L. Claflin, N. R. Catharin, Sheldon C. Collins, Fred E. May, William W. Newton, C. W. Harvey, F. E. Pierce, J. L. Munro, C. Frederic Wellington, Ernest S. Reid, R. H. Welsh, Frank H. Winter, J. R. Halkyard, E. Ashley Cromwell, John A. Andrew, Charles A. Esty F. D. Hatch, Ray Wight, James R. Carter, Norman Harrower, F. Bendel Tracy, Horace S. Proctor, John E. A. Hussey, Arthur L. Hobson, Charles S. Proctor.

M. L. Madden, Hubert L. Carter, Chas. W. Fields, Robert W. Ely, R. O'Neill, R. M. Beckwith, Maurice A. Park, George Olmsted, Jr., Constant Southworth, Fred A. Korbel, E. L. Wood, H. M. Donahue, John G. Clark, Sumner B. Andrew, M. C. Dobrow, A. F. Bell, Henry C. Barr, L. K. Larson, David H. Maynard, H. F. Bigelow, F. Herbolzeimer, Jos. P. Norton, Ralph P. Robinson, Ted Lyman, R. W. Raymond, J. D. Starr, Jr., F. H. Merrill, Ray Allen, Joseph J. Lewis, John J. Barry, G. T. Singleton, M. S. Lefavour, P. B. Fraser, Lem C. Bills, John L. Banley, Robert A. Chase, D. Cheever, Harold A. Allen, Walter M. Pratt, Adna C. Denison, John Fougland, C. E. Rice, Arthur F. Fay, Clifford H. Harris, Walker B. Holmes, Ralph H. Morrill, Edward H. Little.

Lee H. Hallett, C. Knutson, F. H. Masselink, J. N. S. Gibson, R. H. Bingham, Jr., W. F. Hoffman, G. M. Crowther, Herbert J. Simmonds, Howard Wallingford, Dan Abercrombie, Jack Whitney, W. E. Doble, James L. Madden, L. G. Glazier, Ralph W. Allen, Ralph B. Case, J. C. Hankey, M. O. Byrne, J. F. Burke, C. F. Shaw, F. W. Nason, G. S. Chace, Willard H. Loud, W. E. McNaught, John J. Shay, Martin A. Hurlbert, Allen I. Hatfield, Stuart C. Hurlbert, Hubert W. Lockhart, Herbert A. Lindenberg, J. J. O'Brien, C. J. Brown, T. K. Davis, K. H. Ways, Ralph G. Beckett, S. Guy Ashley, Harry W. Gordon, C. S. Hall, Irving N. Esleeck, Robert M. Stone, Carveth Wells, John H. Brewer, Frank B. Cummings and T. Chas. Casey.

Michigan Superintendents Meet

KALAMAZOO, Mich., March 23, 1942—The Michigan Division of the American Pulp and Paper Mill Superintendents association met at the Park American Hotel, Thursday evening March 19—with 65 present. Chairman Nendorf announced the date of the annual Ladies Night was Saturday, April 18. The plans for this event are not definitely completed, but L. L. "Buster" Griffiths of Williams-Gray will positively officiate as "Emsee," giving assurance of the program clicking.

The speaker was Robert D. Ross director of Paper Purchases with the Reuben H. Donnelley Corporation of Chicago. His talk undoubtedly imparted more details of the mechanics of a large printing plant than would ordinarily be heard in a lifetime. His description of the different processes and new developments in the art were most interesting and his plea for closer cooperation between the printer and paper maker must have impressed the gathering. F. L. Zellers, past National President, now located in Chillicothe was up for the meeting.

Those in Attendance

Among those in attendance were the following:—Wm. H. Astle, Michigan Paper Company, Harold E. Barnes, Barnes Printing Company, D. D. Bachelder, Sutherland Paper Company, Harry C. Bradford, Rex Paper Company, Noah Bryant, Bryant Paper Company, J. A. Beirwaltes, E. J. Kelly Company, Ray L. Barton, Michigan Paper Company, J. M. Causey, Kalamazoo Paper Company, Phillip S. Cade, Stein Hall Manufacturing Company, Fred L. Chappell, Sutherland Paper Company, E. T. A. Coughlin, Bryant Paper Company, A. W. Cole, Rex Paper Company, Norman J. Cowie, Hawthorne Paper Company, Olin W. Callaghan, Edgar Brothers Company, Wayne E. Crotty, Bryant Paper Company, Jack Dickson, R. T. Vanderbilt Company, Jack DeWolfe, Kalamazoo Vegetable Parchment Company, P. F. Denner Bryant Paper Company, Paul de Guehery, Michigan Paper Company, D. R. Erichson, Michigan Research Laboratories, O. F. Fischer. Bryant Paper Company, L. L. "Buster" Griffiths, Jr., Williams-Gray Company, P. H. Gideon, Bryant Paper Company, Harold Heath, Rex Paper Company, Fred Hodgmire, Hawthorne Paper Company, Geo. T. Jubb, Kalamazoo Paper Company, Roy Kendall, Bryant Paper Company, W. Kent Kidder, Bryant Paper Company, E. H. Larkin, Bryant Paper Company, Lester H. LaLiberte, Kalamazoo Vegetable Parchment Company

E. E. Ludwig, Bermingham Prosser Company, Edward Minnard, Kalamazoo Paper Box Company, J. W. McClaran, National Starch Products Company, Leon H. Mimms, Kalamazoo Paper Company, C. H. Noble, A. E. Staley Manufacturing Company, Henry Nendorf, Rex Paper Company, W. M. Parkes, Bryant Paper Company, Al Perlick, Kalamazoo Vegetable Parchment Company, Daniel T. Quirk, Peninsular Paper Company, John L. Russel, Bryant Paper Company, George H. Rice, Kalamazoo Vegetable Parchment Company, Robert D. Ross, Reuben H. Donnelley Corporation, R. W. Shew and R. J. Suess, Olsego Falls Paper Company, H. E. Sweetland, Bryant Paper Company, Louis P. Simon, Bermingham Prosser Company, Chas F. Somerville and Robert Smith, Bryant Paper Company, Robert B. Stewart, Kalamazoo Vegetable Parchment Company. A. L. Sherwood and Glen Sutton, Sutherland Paper Company, Willis Taylor and John C. Wood, Kalamazoo Vegetable Parchment Company, Arnold Weller, Sutherland Paper Company, Walter F. Wolfe, MacSim Bar Company, Leo A. Willoughby and Archie Webb, Bryant Paper Company, James A. Wise, Kalamazoo Paper Company, Jess G. Wright, A. M. Meinche Company, Joe Waber, Rex Paper Company and F. L. Zellers, Chillicothe Paper Co.

Heads Up WPB Simplification Work

Howard Coonley, former president of the National Association of Manufacturers and of the American Standards Association, was called to Washington early this month to coordinate and implement the simplification and standardization program of WPB. The division he heads will take its place in the administrative set-up of WPB as one of the branches of the Bureau of Industrial Conservation.

Mr. Coonley is taking a leave of absence from his duties as chairman of the Board of the Walworth Company and has accepted the WPB appointment for three months.

All simplification activities in WPB, including those involving industrial standards, will clear through Mr. Coonley's division. The work, it is planned, will be carried on in cooperation with the Industrial Advisory Committee established in the Division of Industry Operations. Close cooperative arrangements are planned with the standardization activities of WPB, OPA, the War, and Navy Departments, and the Maritime Commission, and also with such agencies as the National Bureau of Standards, the American Standards Association, and the American Society for Testing Materials.

Strathmore Celebrates 50th Year

[FROM OUR REGULAR CORRESPONDENT]

SPRINGFIELD, Mass., March 17, 1942—The Strathmore Paper Company, 50 years old today, presented 25-year service pins to 28 employees at a dinner at 6 tonight at Strathmore Inn, Woronoco, at which Horace A. Moses, president and founder, presided.

Fifty years ago today, St. Patrick's Day, March 17, 1892, Mr. Moses, after coming from his farm home in Ticonderoga, N. Y., to work briefly for the Agawam Paper Company, turned the first shovel of dirt for the building of the Mittineague Paper Company which later became the Strathmore Company.

Grown from its original 50 to 60 employees to 650 today, the company now produces some 60 tons of paper daily in its four mills compared to two tons produced daily at its start. In the early days laborers earned $1.50 a day or $9 a week, working two 12-hour shifts of 72 hours weekly. Today both laborers and office workers are on a 40-hour week and the mills run three eight-hour shifts.

Arriving at the mill at 7 this morning, just as he used to do 50 years ago, 79-years-old President Moses was surprised to find many employees on hand to wish him happy returns on the anniversary.

Obituary

Arthur B. Johnson

Arthur B. Johnson, purchasing agent of the Pejepscot Paper Company, died March 17 at his home at Topsham, Me.

Mr. Johnson came to Pejepscot Paper Company in 1898, and was with the company until his death. He was 65 years of age, and in addition to his duties with the Pejepscot Paper Company, he was chairman of the Brunswick-Topsham Water District, president of the Brunswick Savings Institution and active in civil and fraternal associations of Brunswick and Topsham.

He was a member and deacon of the First Parish Congregational Church at Brunswick, chairman of the Topsham Committee of Twelve for many years, member of the Town and College Club, a past president of the Brunswick Rotary Club and member of the Brunswick Masonic Lodge.

Surviving are his wife, Mrs. Angela Hazelton Johnson; four daughters, Mrs. Robert M. Dudley of Norwich, Vt.; Mrs. William McCarter of Hanover, N. H.; Mrs. Oscar Fellows of Winterport, and Miss Mary Johnson, a senior at Wellesley College; a son, Clarence H., of Richmond, Va.; a sister, Mrs. John A. Cone of Topsham; a brother, Samuel, of Albuquerque, N. M., and eight grandchildren.

G. Stanton Brazeau

APPLETON, Wis., March 23, 1942—G. Stanton Brazeau, 44, a native of Wisconsin Rapids, Wis., died Tuesday, March 17, at his home in Everett, Wash., following a heart attack. He was mill manager of pulp production for the Weyerhaeuser Timber Company.

Before going west, Mr. Brazeau was associated with the Appleton Machine Company, Appleton, Wis., as a sales representative. He served during the last World War in the naval aviation division. Survivors include his father, J. E. Brazeau, Wisconsin Rapids, his widow and two children.

The body was conveyed to Wisconsin Rapids, where funeral services were held Saturday, March 21.

Lloyd B. Edgerton

Lloyd B. Edgerton, vice-president of the Philadelphia Quartz Company, Philadelphia, Pa., died March 15 at the Presbyterian Hospital, that city, after a long illness. He was 55 years of age.

Born in Barnesville, Ohio, Mr. Edgerton graduated from Ohio State University, Class of 1909. After obtaining his degree of Mechanical Engineer, he was associated with General Electric Company at Schenectady, N. Y., in their steam turbine testing and service department. In 1913, he entered the employ of the Philadelphia Quartz Company, assuming charge of the engineering department. He was appointed works manager in 1930, director in 1934 and vice-president in 1935. He was a member of the American Society of Mechanical Engineers and the Engineers' Club of Philadelphia.

Mr. Edgerton is survived by his wife, Hazel M., two sons, B. Dale Edgerton of Trenton, N. J. and Donald, a student at the University of Virginia and a daughter, Mrs. Robert T. Gladstone, Jr. of Norfolk, Va.

TO DISCUSS PLANT PROBLEMS

(Continued from page 7)

fires, it was stated, but the undergrowth created presents an additional hazard.

Senator Philip Downing of Amberg, Wis., is assisting in the movement. He spoke at the board meeting, indicating opposition to the plan by southern counties.

Last Series of Safety Meetings Open

Paper mills and allied industries of Neenah and Manashe, Wis. will hold the last of a series of three winter safety meetings at the high school auditorium at Neenah Tuesday evening, March 24. The speaker will be the Rev. T. Parry Jones of Sheboygan, Wis., whose subject will be "Low Ways of the Highways." Robert W. Wood of the Kimberly-Clark Corporation will be the chairman. A demonstration of fire prevention will be conducted by L. F. Statz of the Wisconsin Industrial Commission, who will include information on incendiary bombs. The Lakeview mill band of Kimberly-Clark will give a concert.

Run-Off Waters Being Impounded

Impounding of the spring run-off waters in the Wisconsin River has been begun by the Wisconsin Valley Improvement Company, Wausau, Wis. Various control dams along the river have been closed so the storage reservoirs will be filled up for drought periods. Only enough water is being released to serve the hydro-electric plants of various paper mills and the utility plants.

Paper Men Appointed to WPB

Arthur G. Wakeman, operating manager of the Fox River Paper Corporation, Appleton, Wis., has been appointed as one of ten industrial specialists to serve the War Production Board in Washington, D. C. He will act as section chief and consultant to the pulp and paper branch. C. E. Frudden, executive engineer of the Allis-Chalmers Manufacturing Company, West Allis, Wis., has been named to a like capacity for the farm machinery bureau.

Ben Alexander of Wausau, Wis., president and executive director of the Masonite Corporation, has been appointed acting chief of the textile, clothing and leather goods branch of the War Production Board. He succeeds Robert R. Guthrie, who resigned. Mr. Alexander has been in Washington since March 1, when he was named special assistant to Philip D. Reed, chief of the WPB bureau of industry branches.

L. O. Schubart, secretary-treasurer of the Neenah Paper Company, Neenah, Wis., has been appointed by Clifford E. Ives, state director, on an advisory committee to serve with the Appleton, Wis. district office of the WPB contract distribution branch.

Robert M. Quigley, sales manager of the Bay West Paper Company, Green Bay, Wis., has been appointed sugar administrator for Brown County, working with the rationing board.

Norton Co. Awarded Navy "E"

Frank Knox, Secretary of the Navy, has informed George N. Jeppson, president, that the Navy Board for Production Awards has designated the Norton Company a recipient of the Navy "E" award for production achievement.

N. E. TAPPI Discusses Viscosity

The New England Section of the Technical Association of the Pulp and Paper Industry met at the Roger Smith Hotel, Holyoke, Mass., on Friday, March 20, 1942. Norman I. Bearse of the Champion-International Paper Company presided as chairman.

The principal speaker was Joseph H. Burgen of the American Writing Paper Company who discussed the use of cuprammonium viscosity- measurements in evaluating rags and pulps for papermaking. Mr. Burgen outlined the relations between this test and several physical tests for indicating the use properties of the papers being made. The paper was followed by an excellent discussion by many of those present.

O. J. Brown of Godfrey L. Cabot, Inc., showed a sound film entitled "Inside the Flame" which showed the manufacture and applications of carbon black.

Those present included: Attilio P. Barea, P. Q. Barnhardt, N. I. Bearse, Joseph H. Burgen, Fred W. Schneider, R. F. Blount, Owen J. Brown, Jr., S. A. Brunnell, Champion, C. H. Child, Mr. and Mrs. L. Crouse, Mr. and Mrs. R. H. Doughty, W. L. Foote, A. M. Gair, William G. Glenslon, O. F. Hutchinson, Werner Kaufmann, Helen U. Kiely, R. E. Kilty, A. D. King, A. P. Knaus, W. E. Larkin, F. W. Lyon, R. G. Macdonald, Jack McKela, James J. Manion, John C. Marrone, H. L. Mellen, Ernest O. Nash, P. A. Packard, E. O. Reed, A. E. Regnier, Frank T. Rudiak, W. G. Russell, Chas. P. Slocum, E. W. Stretcher, George W. Sullivan, B. E. Teale, Mr. and Mrs. L. B. Tucker, Mr. and Mrs. Kingdon R. Watt, Jr., Harry L. Wechter and Charles H. Wilson, Jr.

New TAPPI Members

The executive committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

Alan P. Adrian, student, the Institute of Paper Chemistry, Appleton, Wis.

Frank H. Bopp, chemist, Fiber Container Division, Research Department, American Can Company, Maywood, Ill., a 1936 graduate of Michigan State College, and received his M. S. degree from Washington University in 1938.

Sydney Coppick, chemist, American Viscose Corporation, Marcus Hook, Pa., a 1941 graduate of the New York State College of Forestry.

Frederick S. Crysler, general superintendent, Container Corporation of America has been transferred from the Associate to the Active Grade.

Fred E. Culp, chemical engineer, Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., a 1936 graduate of Ohio State University and received his M.S. degree from the Institute of Paper Chemistry in 1939.

Robert M. Levy, chief research chemist, Ecusta Paper Corporation, Pisgah Forest, N. C., a 1937 graduate of Armour Institute of Technology, and received his Ph.D. degree in 1940.

Malcolm L. Taylor, assistant chief chemist, Union Bag and Paper Corporation, Savannah, Ga., a 1940 graduate of Yale University, and formerly with Southern Kraft Corporation, Panama City, Fla.

Earl P. Lovenheim, assistant plant chemist, Continental Paper Company, Ridgefield, Park, N. J., a 1937 graduate of the University of Michigan, and formerly with Kendall Manufacturing Company, Bradford, Pa.

Frank Makara, research chemical engineer, Hygrade Sylvania Corporation, Salem, Mass., has been reinstated as an Active member.

Melvin L. McCreary, chief chemist, West Virginia Pulp and Paper Company, Williamsburg, Pa., a 1935 graduate of Juniata College.

C. S. Miner, Jr., research chemist, The Miner Laboratories, Chicago, Ill., a 1940 graduate of Penn State College.

Herbert Mosheim, chemist, Moore & Thompson Paper Company, Bellows Falls, Vt., a 1930 graduate of Koethen College, Germany, and formerly with Gebr. Mosheim, Vlotho, Germany.

Richard M. Sinclair, student, University of Maine, Orono, Maine.

Bernard F. Smith, process engineer, Kimberly-Clark Corporation, Neenah, Wis., a 1926 graduate of the University of Wisconsin, and formerly with Orbison & Orbison, Appleton, Wis.

Stuart E. Swanson, chemical engineer, Bigelow-Sanford Carpet Company, Inc., Thompsonville, Conn., a 1927 graduate of Northeastern University.

George H. Tomlinson II, research director, Howard Smith Paper Mills, Ltd., Cornwall, Ont., Canada, a 1935 graduate of McGill University.

Lambert Van Roy, chief chemist, Central Paper Company, Menasha, Wis., a 1939 graduate of Ripon College and formerly with Kimberly-Clark Corporation.

Sigmund Wang, manager of laboratories, Canadian International Paper Co., Hawkesbury, Ont., Canada, has been reinstated as an Active Member.

Jesse W. Welch, control chemist, Flintkote Company, Lockport, N. Y., attended Collegiate Center for two years.

Priorities and Chemicals

A clear explanation of the operation of the chemical industry under the present regulations imposed by the war program, is presented in Calco Technical Bulletin No. 648. The booklet, just issued by the Calco Chemical Division, American Cyanamid Company, Bound Brook, N. J., is entitled "The Priorities System as Related to the Chemical Industry". A copy of the booklet will be sent by the company upon request.

It presents briefly the set-up, functions and objectives of the Office of Emergency Management, the Priorities System, Preference, Allocation and Limitation Orders, Price Control, the mandatory compliance of industry, WPB Orders and OPA Price Schedules.

Victoria Mills Busy on War Orders

FULTON, N. Y., March 23, 1942—The Victoria Paper Mills, organized in 1880, is devoting about fifty per cent of its total production directly or indirectly to the defense program and this amount will be increased if necessary. During the last war a large portion of the company's product was also used by both the army and navy. Started in a small way sixty-two years ago the concern has enjoyed a steady growth and at the present time is employing in the neighborhood of 150 men. The company has also built up an enviable reputation and its products of high grade tissue papers have met with the satisfaction of consumers throughout the country.

The Paper Industry, like others, should be served for the best interests of all concerned but, at the same time, with the least hindrance possible to the procurement of necessary war materials during these trying times.

In a spirit of patriotism and cooperation to lend whatever aid possible, we suggest increasing efficiency of production with the least amount of material and machine-tool work.

Increased sheeting of rolls doesn't necessarily mean duplicating of present finishing room equipment but rather the speeding up of what you already have.

We are in position to help you solve your sheet handling problems by offering to you our patented Overlapping Delivery at a reasonable cost and a proven worthwhile investment.

MAXSON AUTOMATIC MACHINERY COMPANY

(Sheet Counting and Handling Machinery)

Westerly, Rhode Island, U. S. A.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending March 21, 1942

STOCKS

	High	Low	Last
A. P. W.	....	....	....
Armstrong Cork Co.	23¾	22⅞	23
Celotex Corp.	7⅜	6⅞	7⅛
Celotex Corp., pf.	....	....	....
Certain-Teed Products Corp.	2	1⅞	1⅞
Certain-Teed Products Corp., pf.	26⅝	26	26⅜
Champion Paper & Fibre Co.	16¼	16	16
Champion Paper & Fibre Co., pf.	....	....	....
Congoleum Nairn Co.	14	13¾	13¾
Container Corp. of America	12¾	12½	12½
Continental-Diamond Fibre Co.	7½	7¼	7½
Crown-Zellerbach Co.	10⅞	10⅜	10⅜
Crown-Zellerbach Co., pf.	78½	77¾	78
Flintkote Co.	10⅞	10	10⅞
Robert Gair	2	1⅞	2
Robert Gair, pf.	10¼	10	10¼
International Paper Co.	13¾	13	13
International Paper Co., pf.	57	55	55
Johns-Manville Corp.	61½	58¾	60⅝
Johns-Manville Corp., pf.	....	....	....
Kimberly Clark Corp.	27½	27½	27½
MacAndrews & Forbes	20⅛	19½	19½
MacAndrews & Forbes, pf.	....	....	....
Masonite Corp.	26½	25¾	25¾
Mead Corp.	6¾	6½	6⅝
Mead Corp., pf.	....	....	....
Paraffine Companies, Inc.	23	23	23
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	9¼	9⅛	9⅛
Rayonier, Inc., pf.	25	24¼	24½
Ruberoid Co.	19½	18¾	19½
Scott Paper Co.	31	31	31
Scott Paper Co., pf.	107½	107½	107½
Sutherland Paper Co.	19¼	18⅝	18¾
Union Bag & Paper Corp.	8⅞	8⅝	8¾
United Paperboard Co.	3⅜	3⅛	3⅜
U. S. Gypsum Co.	47⅜	45½	45½
U. S. Gypsum Co., pf.	168	168	168
West Virginia Pulp & Paper Co.	15⅞	15⅞	15⅞

BONDS

Abitibi Pulp & Paper Co. 5s '53	61¼	57¾	60¾
Celotex Corp. 4½s '47	95½	94¾	94¾
Certain-Teed Products Corp. 5½s '48	86	85	85¾
Champion Paper & Fibre Co. 4¾s '50	105	104⅝	104⅝
Champion Paper & Fibre Co. 4¾s '50	102¾	102½	102½
International Paper Co. 6s '55	105¼	104¾	104¾
International Paper Co. 5s '47	105	104½	104½
Mead Corp. 4½s '55	106	104⅝	104⅝
West Virginia Pulp & Paper Co.	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending March 21, 1942

STOCKS

	High	Low	Last
American Box Board Co.	4⅛	4⅛	4⅛
Brown Co., pf.	....	....	....
Great Northern Paper Co.	....	....	....
Hummel-Ross Fibre Corp.	4½	4½	4½
National Container Corp.	8¼	8¼	8½
St. Regis Paper Co.	2	1⅞	2
St. Regis Paper Co., pf.	110¼	108½	108½
Taggart Corp.	3⅛	3⅛	3⅛

BONDS

American Writing Paper Co. 6s '61	80½	80	80½

Hinde-Dauch Nets $1,112,195

The Hinde & Dauch Paper Company and subsidiaries for 1941, reports a net profit, after $1,900,000 Federal taxes and $300,000 special post-emergency reserve, of $1,112,195, equal to $2.59 a common share, against $975,458, or $2.21 a common share in 1940 after $305,000 Federal tax charges.

Great Lakes Nets $453,146

The Great Lakes Paper Company for 1941, reports a net income in Canadian currency, of $453,146, equal, after dividend requirements on Class A and B preference shares, to 18 cents each on 100,000 common shares, against $318,275, or $1.59 a share, on perference stock in 1940.

Rolland Earns $675,201

MONTREAL, Que., March 23, 1942—The report of the Rolland Paper Company, which manufactures fine paper at St. Jerome and Mont Rolland, shows that an increase of about 40% in sales resulted in a sharp increase in operating profit which rose to $675,201 against $542,140 in the preceding year. After increased charges, including tax provision of $174,653 against $72,109, net profit was slightly higher at $175,540 against $161,723 in the preceding year. After preferred dividends this net was equal to $1.42 a share on 60,001 shares of common stock outstanding against $1.19 the year before. After all dividends an amount of $40,540 was added to surplus which, after adjustments, stood at $385,159 against $358,963 at the previous year-end.

Current assets totalled $1,626,821 against $1,358,690 a year ago and current liabilities totalled $619,632 against $487,863, leaving working capital at $1,007,189 against $870,828 at the previous year-end.

Chillicothe Earns $147,247

Record breaking production has been announced by Hector McVicker, president of the Chillicothe Paper Company, in the company's annual report to shareholders.

All tonnage records were shattered and net income, thanks to price advances and economical operations, was the highest ever. After deducting federal income and excess profit taxes of $149,832.20, however, the net profit was sliced to $147,247.69, a figure slightly under that for the year 1939, the report said. Net sales were put at $3,020,717.55.

Barber-Ellis Profit Up Sharply

Barber-Ellis of Canada, Ltd., in the year ended December 31, 1941, had a net profit of $49,294, equal after regular preferred dividend requirements, to $1.02 a share of 44,000 common shares of $10 par value outstanding. This compares with net profit of $9,702 in the previous year or 12 cents a common share. Balance sheet as of December 31, 1941, shows current assets of $989,589 and current liabilities of $293,140, leaving net working capital of $696,449, compared with $765,799 at June 30, 1941.

Nekoosa-Edwards Votes Dividend

A dividend of 1% on the capital stock of the Nekoosa-Edwards Paper Company, Port Edwards, Wis., was declared by the board of directors at a meeting last week, according to announcement of J. E. Alexander, president. Checks will be mailed to stockholders before the end of the month.

San-Nap-Pak Nets 73 Cents

The San-Nap-Pak Manufacturing Company for 1941, reports a net income of $207,229 equal, after preferred dividends, to 73 cents each on 250,000 common shares, against $140,836, or 47 cents a common share in 1940.

You Get These Advantages:

YOU CONSERVE ALUM AND ALUMINA—it's not lost down the sewer.

YOU CONSERVE PULP — there is a higher retention of fibers in the sheet.

YOU PROTECT AND CONSERVE EQUIPMENT—lower acidity of solution lessens corrosive attack on expensive, hard-to-get copper, copper alloy wires and other metals as well as felt.

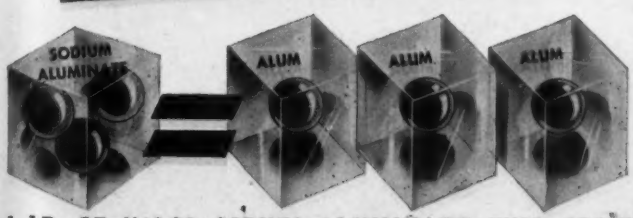
YOU GET BETTER PAPER—1.—In many cases, less alumina goes into the sheet, eliminating rattle and brittleness. 2.—The paper is less acid and hence has a longer life.

THE use of alum alone to produce alumina in sizing paper can be extremely wasteful, and today, in face of an alumina shortage, this waste takes on a new significance. When large dosages of alum are required, the pH of the solution in the beater is lowered to such an extent that the rosin size and the alumina fail to react completely. Thus, when the water is discarded, important quantities of alum and alumina are lost.

This loss can be overcome through the admixture of Nalco Sodium Aluminate, an alkaline substance, which will produce 3 times as much alumina per pound as is contained in alum. By applying alum and Sodium Aluminate in the correct proportions, the exact pH required for best results can be maintained. Less alum is required and the reaction of the alumina is more complete, permitting practically no waste.

In addition to this conservation of alum and alumina, you get all the important plus values at the left.

Why delay facing the problem of an alum shortage? Write to Nalco today — it will pay you well.



1 LB. OF NALCO SODIUM ALUMINATE WILL PROVIDE ALUMINA EQUIVALENT TO THAT OF 3 LBS. OF ALUM.
This fact plus the other advantages and savings of Nalco Sodium Aluminate means that *it saves you money in the long run!*

Nalco

CONTROLLED SIZING METHOD — SLIME CONTROL — WATER SOFTENING — BOILER FEEDWATER TREATMENT—Developed in the world's foremost water treatment laboratories.

NATIONAL ALUMINATE CORPORATION, 6221 W. 66th Place, Chicago, Ill.

CONSTRUCTION NEWS

Salem, Ore.—The Oregon Pulp and Paper Company, manufacturer of writing and other paper stocks, glassine, greaseproof and other processed papers, has approved plans for new plant unit for manufacture of paper boxes. It will be three-story, approximately 95 x 100 feet, located at 185 South Front street. Cost is reported over $75,000, with equipment. Erection contract has been awarded to A. A. Siewert, 338 North Winter street, Salem, and work on superstructure will begin soon.

Lynchburg, Va. — Mead Corporation, Heald Division, manufacturer of paper board products, has completed plans for new addition to local mill in Lower Basin area. It will be two-story, about 45 x 123 feet, used for general service, including machine shop, laboratory, storage department, offices, etc. Cost estimated close to $50,000, including equipment. General contract for erection has been let to C. L. Lewis, Allied Arts Building, Lynchburg, and work will proceed at once. Main offices of company are at Chillicothe, Ohio.

Brokaw, Wis.— Wausau Paper Mills Company, manufacturer of bond, ledger and other paper stocks, is making a glass block wall installation in connection with rebuilding and repairing of mill damaged by flood last fall, previously referred to in these columns, with contract for such work awarded to the Hoffer Glass Company, Wausau. It is expected to complete the project in near future. C. R. Meyer & Sons Company, 50 State street, Oshkosh, Wis., has the general construction contract, which provides for complete modernization in work being handled. No estimate of cost has been announced.

Los Angeles, Calif.—Fiberboard Products, Inc., 4444 Pacific boulevard, Vernon, Los Angeles, manufacturer of box board, bristol board, wall board and kindred products, has completed plans for new one-story addition to mill, estimated to cost over $30,000, including machinery. A building permit has been issued and work will be placed under way at once. General contract has been awarded to MacIsaac & Menke, Inc., 3445 Union Pacific avenue, Los Angeles.

Cleveland, Ohio — The Cleveland Container Company, 10630 Berea avenue, manufacturer of paper boxes and containers, has approved plans for new addition to local plant No. 2, at 6303 Barberton avenue, consisting of a one-story structure, with loading dock, railway siding and other facilities. Cost is estimated close to $45,000, including equipment. General erection contract has been awarded to Bage & Ford Company, 1227 Webb road, and work is scheduled to be placed under way at early date.

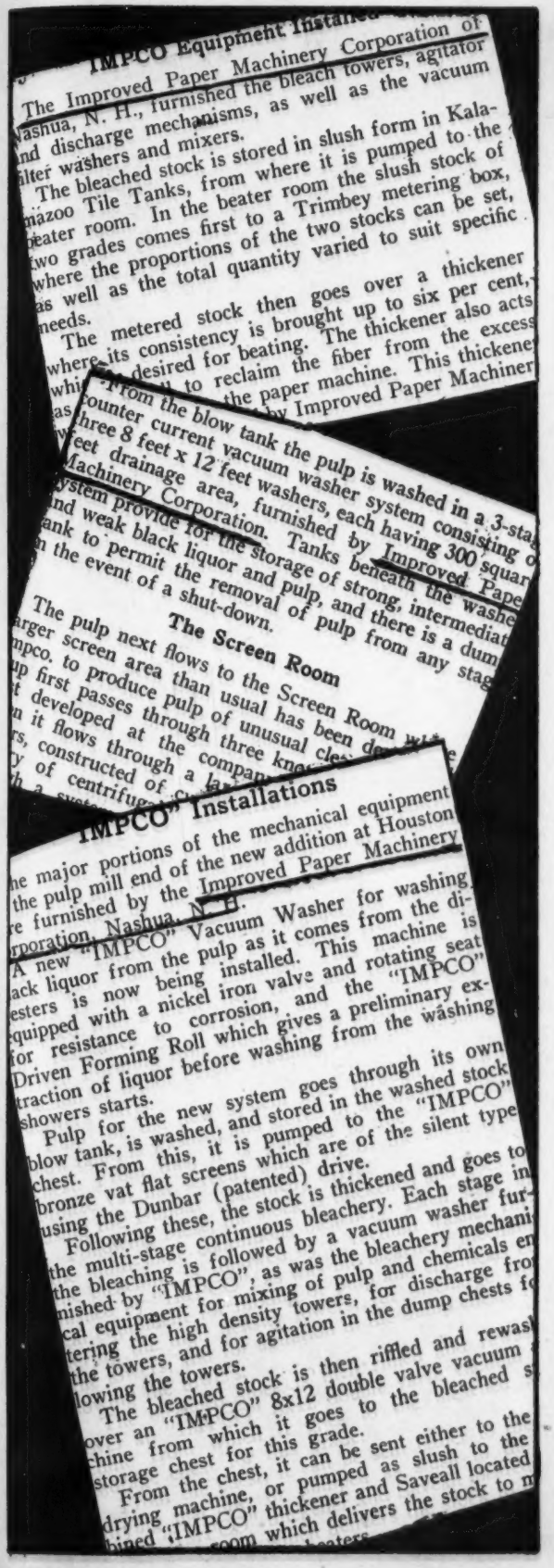
Buffalo, N. Y.—The F. M. Burt Company, Inc., 514 Seneca street, manufacturer of paper boxes and containers for the cosmetic and drug trades, etc., is developing a new type of container made of special paper board and plastics to replace certain metal boxes and packages previously used for lipstick and other cosmetics; also paper containers for compacts, vanities and allied specialties. Company will begin work at once on initial order for about 1,000,000 such box units, with cost, it is stated, approximately about 25 per cent less than metal containers. Further investigations are now in progress for the development of paper bottle caps for use on screw-top bottles used for products of character noted.

Chicago, Ill.—The Mid-West Electric Manufacturing Company, 1639 West Walnut street, manufacturer of electrical goods, has approved plans for new building on adjoining site for paper carton division for containers for packing and shipping company products. It will be two-story, about 37 x 105 feet, and will be used for storage, distribution and other carton service. General erection contract has been awarded to Frank J. Munao, 5034 West School street, and work will proceed at once. Cost is estimated close to $30,000, including equipment. R. H. Maiworm, 214 North Austin avenue, Oak Park, Ill., is architect.

New York, N. Y.—Certain-Teed Products Corporation, 100 East 42nd street, manufacturer of wall board, fiber board, roofing products, etc., has concluded arrangements with Govenment for supervision of construction and operation of new plant to be erected in Texas (exact location not announced) for production of materials for war service, exact character temporarily withheld. Contract also provides for equipment installation and other features of work. Plant will comprise several large one and multi-story buildings, and will cost in excess of $5,000,000, with machinery. Financing will be provided by Defense Plant Corporation, Washingtonu, D. C., a Federal agency. Construction is scheduled to begin at early date.

Red Rock, Ont. — The Brompton Pulp and Paper Company, Ltd., East Angus, Que., manufacturer of kraft, manila and kindred paper stocks, newsprint, box board, etc., is said to be planning for an expenditure of about $250,000 for completion of mill of Lake Sulphite Pulp Company, Ltd., Red Rock, recently acquired from receiver, as previously noted in these columns, to be operated in future as a branch mill. Fund noted will be used for buildings, machinery and equipment, with complete facilities to place the mill ready for service. Work will be placed under way at early date.

Fort William, Ont.—The Great Lakes Paper Company, Ltd., manufacturer of newsprint, will carry out expansion and improvements at pulp mill at early date, designed to provide for an increase in capacity of sulphite pulp from 25,000 to 40,000 tons per annum. Work will include buildings and installation of machinery, estimated to cost close to $300,000. Program is scheduled for completion during the summer. Company is operating all divisions of the mill on a 100 per cent capacity basis, giving employment to maximum working force, and will continue on that schedule for an indefinite period.



IMPCO Equipment Instal

The Improved Paper Machinery Corporation of Nashua, N. H., furnished the bleach towers, agitator and discharge mechanisms, as well as the vacuum filter washers and mixers.

The bleached stock is stored in slush form in Kalamazoo Tile Tanks, from where it is pumped to the beater room. In the beater room the slush stock of two grades comes first to a Trimbey metering box, where the proportions of the two stocks can be set, as well as the total quantity varied to suit specific needs.

The metered stock then goes over a thickener where its consistency is brought up to six per cent, desired for beating. The thickener also acts to reclaim the fiber from the excess the paper machine. This thickene by Improved Paper Machiner

From the blow tank the pulp is washed in a 3-sta counter current vacuum washer system consisting three 8 feet x 12 feet washers, each having 300 squar feet drainage area, furnished by Improved Pape Machinery Corporation. Tanks beneath the washe system provide for the storage of strong, intermediat and weak black liquor and pulp, and there is a dum tank to permit the removal of pulp from any stag in the event of a shut-down.

The Screen Room

The pulp next flows to the Screen Room w larger screen area than usual has been d mpco, to produce pulp of unusual cle up first passes through three kn t developed at the compa n it flows through a rs, constructed of y of centrifu h a swe

"IMPCO" Installations

he major portions of the mechanical equipment the pulp mill end of the new addition at Houston re furnished by the Improved Paper Machinery rporation, Nashua, N. H.

A new "IMPCO" Vacuum Washer for washing ack liquor from the pulp as it comes from the di esters is now being installed. This machine is equipped with a nickel iron valve and rotating seat for resistance to corrosion, and the "IMPCO" Driven Forming Roll which gives a preliminary ex traction of liquor before washing from the washing showers starts.

Pulp for the new system goes through its own blow tank, is washed, and stored in the washed stock chest. From this, it is pumped to the "IMPCO" bronze vat flat screens which are of the silent type using the Dunbar (patented) drive.

Following these, the stock is thickened and goes to the multi-stage continuous bleachery. Each stage in the bleaching is followed by a vacuum washer fur nished by "IMPCO", as was the bleachery mechani cal equipment for mixing of pulp and chemicals en tering the high density towers, for discharge fro the towers, and for agitation in the dump chests fo lowing the towers.

The bleached stock is then riffled and rewas over an "IMPCO" 8x12 double valve vacuum chine from which it goes to the bleached s storage chest for this grade.

From the chest, it can be sent either to the drying machine, or pumped as slush to the bined "IMPCO" thickener and Saveall located room which delivers the stock to m

INVARIABLY

it's

"IMPCO"

for

BETTER EQUIPMENT

IMPROVED
PAPER MACHINERY
CORPORATION

NASHUA • NEW HAMPSHIRE

Instrumentation Studies XXXIX*

The Thwing Multiple Fold Tester

By the Staff of The Institute of Paper Chemistry

Abstract

The Thwing multiple fold tester, designed for evaluating the folding endurance of 10 paper specimens at once, applies alternately a creasing and a tensile stress. A brief examination of one instrument, presumably typical, has revealed several mechanical defects which could and should be corrected and certain fundamental drawbacks which suggest that a modification of the basic design would be desirable.

As mentioned in Instrumentation Studies XXXI *(1)*, all devices which have been developed for measuring the folding endurance of paper operate on the same general principle: namely, that of applying both a folding and a tensile stress. In the more common methods, both stresses are applied simultaneously; the specimen is folded back and forth while under relatively constant tension until complete failure occurs. In the case of the Schopper bending endurance tester and the M.I.T. fold tester, the so-called folding action is accomplished by means of the oscillation of one of the two jaws which holds the strip under tension. In the older type Schopper fold tester the specimen under spring tension extends through a rectangular slot in a thin metal plate. As the plate reciprocates between two pairs of rollers, the sample is folded back and forth until it breaks under the tension.

The Thwing multiple fold tester *(2)* similarly involves the application of folding and tensile stresses, but these are applied alternately rather than simultaneously and the folding stress results from an actual crease, rather than from a bending action around the corners of a metal jaw or the edges of a slotted metal plate.

* This report is one of a series issued as a part of the Instrumentation Program of the American Paper and Pulp Association.

Description of Instrument

The instrument consists of 10 testing units synchronously driven and capable of testing 10 specimens simultaneously, hence the adjective "multiple" in the name (*see* Figs. 1, 2, and 3).

Each specimen is inserted between two jaws, both of which are free to move in a vertical direction. At the uppermost position of the lower jaw assembly, the test specimen is creased between the anvils 1 and 3, or 2 and 4 (*see* Fig. 3) under pressure due to the weight of the upper jaw assembly. While the lower assembly is on the way up, the specimens are forced into the correct position for creasing by means of the pins (7) (*see* Fig. 2) which move alternately to the right and to the left, just touching the specimens approximately at the point where the crease will be formed. The pins are operated by a lever (8) actuated by a cam (9) which is driven by the same shaft that moves the lower jaw assembly. By the time the lower assembly comes into contact with the upper assembly, the pins have been moved out of the way. Figure 1 shows the pins just touching the test strips, whereas Fig. 2 gives a view of the cam (9) which operates the pins.

The reciprocating motion of the lower jaw assembly is imparted by means of a moving bar (10) operated by cams (11 and 12 in Figs. 1 and 2) at

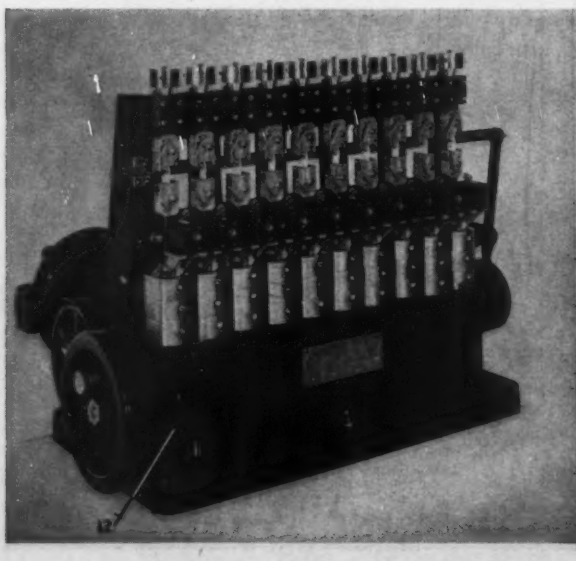


FIG. 1
The Thwing Multiple Fold Tester

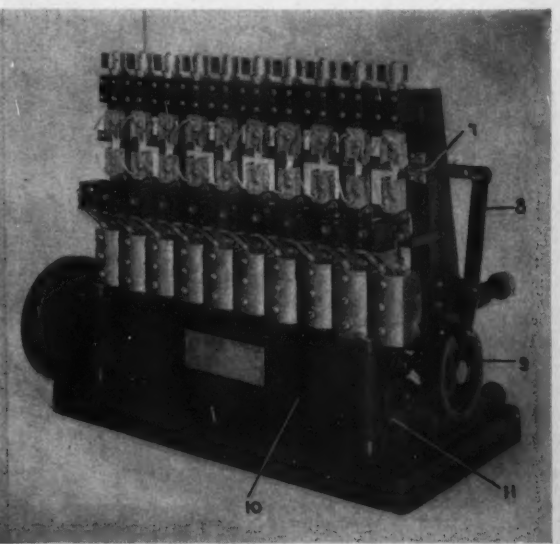


FIG. 2
The Thwing Multiple Fold Tester

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either end. As the lower jaws move away from the upper jaws, the paper specimens are straightened, and as the supporting bar continues to drop, the entire weight of each lower jaw assembly is supported by the corresponding test strip. This tension is maintained until the supporting bar starts its upward motion. As the bar passes the zero point—that is, that point in the cycle at which the specimens are always inserted—all tension is removed. As the second cycle begins, the folding pins (7) come into action again, this time touching the test strips from the opposite side so that they fold in the opposite direction. The pins are moved out of the way, the jaws come together, and the strip is creased. This action is continued until the test specimen breaks. At this point the lower assembly is no longer supported by the specimen as it formerly was during one part of the cycle. Instead, the lower assembly rides all the way down on the supporting bar (10 in Fig. 2), and the arm (13 in Fig. 3) which operates the counter (14) for that particular specimen or head is disengaged.

Accuracy of Construction

With the objective of evaluating the suitability of the multiple fold tester for determining the folding endurance of papers, the degree of similarity among the various heads was studied by measurements of their pertinent dimensions and weights, and by qualitative observations and actual tests on paper specimens. Provision was made in the design of the instrument for varying the tension applied to the test strip and some work was done to demonstrate the effect of this factor. As the work progressed, it became desirable to study the influence of the mass of the upper jaw assemblies as well.

Before adjustments of any sort were made on the instrument, a calibration run was made with a rag-content bond paper. Fifty test strips were used with each head. After this run the machine was dismantled and various measurements were made, particularly with regard to the upper and lower jaw assemblies. A second calibration run was then made, using the same paper, to see whether the dismantling and reassembly of the machine had caused any change from the first set of values. The results of these two

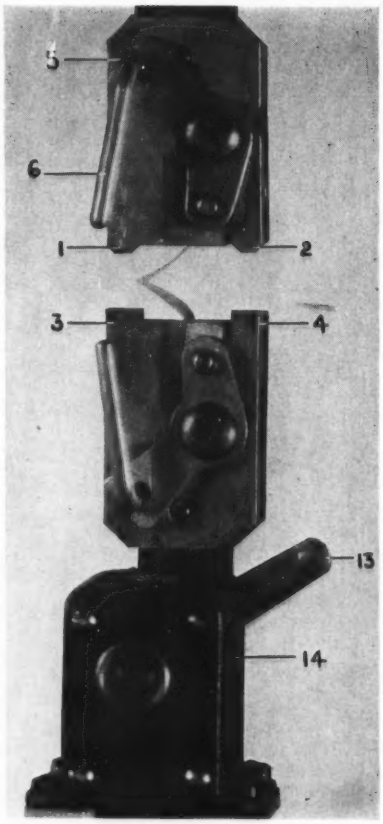


FIG. 3
Upper and Lower Creasing Assemblies

series of tests are presented in Table IV and the first two rows of Table II. With the exception of head 7, which will be discussed later, no noticeable differences between the average results of the two runs were observed. It should be mentioned that the specimens used in this instrument are of the same

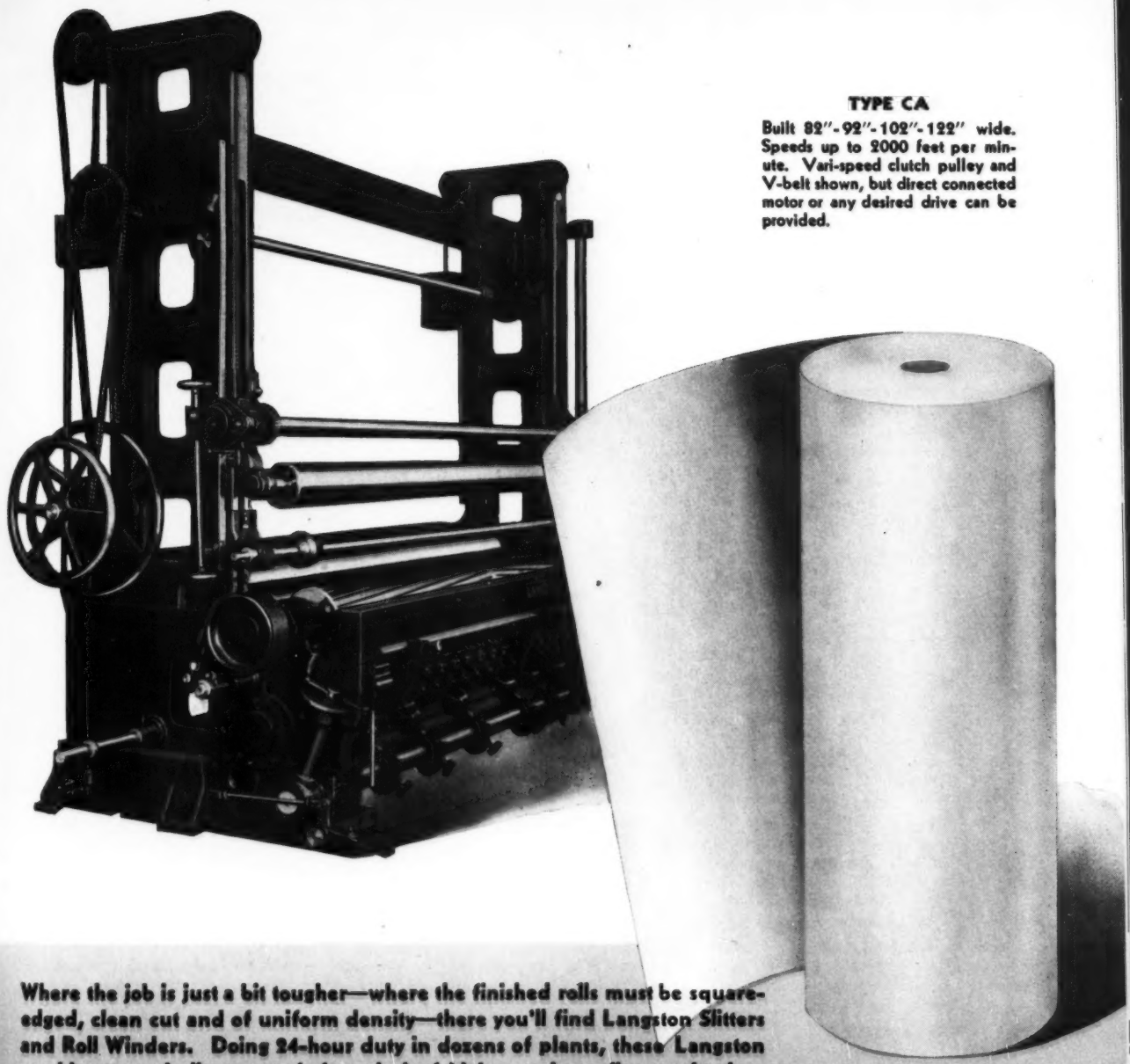
TABLE I.—CRITICAL DIMENSIONS OF CREASING MECHANISMS
(All dimensions are in inches)

Head number	1	2	3	4	5	6	7	8	9	10
Distance between jaws, zero position	0.814	0.829	0.804	0.832	0.831	0.834	0.823	0.809	0.826	0.841
Height of upper left anvil	0.045	0.050	0.040	0.070	0.070	0.060	0.080	0.040	0.060	0.050
Height of upper right anvil	0.040	0.060	0.040	0.060	0.050	0.060	0.070	0.050	0.060	0.050

TABLE II—FOLD ENDURANCE RESULTS

Sample	Paper	Tension kg.	Number of Strips Tested Each Head	Head Number 1	2	3	4	5	6	7	8	9	10	Average Omitting Head 7	Average of All Ten Heads
1	Rag-content bond (13 lb., 17 x 22—500)	2.0	50	560	606	602	583	601	649	719	600	626	537	596	608
1	"	2.0	25	526	652	631	557	635	677	829	589	683	552	611	633
2	Ledger (25 lb., 17 x 22—500)	2.0	20	265	303	332	310	282	337	357	314	260	249	295	301
2	"	1.5	20	880	1044	1030	1133	893	1078	1497	960	917	967	989	1040
2	"	1.0	20	2334	2784	2846	2827	2384	2973		2841	2483	2559	2670	
2	"	0.5	1	11663	14161	12004	11555	14620	14056		12213	12110	12900	12809	
3	Mimeograph bond (21 lb., 17 x 22—500)	2.0	25	14	15	15	15	15	16		16	16	16	15	
3	"	1.5	25	49	57	52	57	54	61		53	53	56	55	
3	"	1.0	25	224	281	291	273	240	305		263	268	268	268	
3	"	0.5	25	2484	3129	3076	3246	2376	3073		2558	2763	2780	2832	
4	S. C. book (60 lb., 25 x 38—500)	2.0	20	4	4	4	4	4	4		4	4	4	4	
4	"	1.5	20	6	7	7	7	7	7		7	7	6	7	
4	"	1.0	20	16	20	19	20	17	21		18	19	18	19	
4	"	0.5	20	58	72	70	73	59	73		68	60	64	66	
5	Envelope (20 lb., 17 x 22—500)	2.0	20	124	144	144	133	146	160	158	138	143	128	140	142
5	"	1.5	20	497	535	575	528	550	655	619	538	513	497	543	551
5	"	1.0	20	1693	1911	1885	1945	1909	2313	2312	1917	1670	1613	1873	1917
5	"	0.5	10	5196	5683	5589	6421	5788	9025	8280	6380	6197	5788	6230	6435

Note: Results are recorded in terms of *single* folds and refer to tests made in the machine direction only (i.e., the line of rupture was perpendicular to the machine direction).



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width as those normally used in other fold testers—namely, 15 mm.—but that the length is less, being approximately 1.5 inches. Because of the small size of the test strip, it is particularly advantageous to use tweezers for inserting the test strip between the jaws. Accordingly, tweezers were used in handling the specimen at all times and rubber gloves were worn in cutting the samples to avoid any change in their moisture content due to perspiration from the hands of the operator.

The anvils and jaws of the instrument were carefully examined. It was found that the weight of the upper assemblies varied between 515 and 517 grams; in the lower assemblies, which should weigh 500 grams with the extra weights removed, the weights varied between 498.4 and 499.2 grams. All the auxiliary weights used to vary the tension on the head were found to be within one gram of weighing 500 grams.

The clearance between the anvils at the uppermost position of the lower jaw assembly was in most cases less than 0.0015 inch (that thickness being the smallest which could be measured with means available). However, in head 6, the clearance on one side was less than 0.0015 inch while on the other side it varied from less than 0.0015 inch to 0.002 inch. In head 10 the separation on one side was less than 0.0015 inch while on the other side it varied between less than 0.0015 and 0.004 inch.

The distance between the upper and lower jaws at the point of clamping, with the lower assembly in the zero position, varied between 0.804 and 0.841 inch. The actual widths of the anvils of the upper assemblies varied by only 0.01 inch, but the heights of the anvils varied between 0.04 and 0.08 inch. As a result of these discrepancies, strips on certain heads were not properly creased, particularly in the case of stiff or thick specimens. The results of some of the more important measurements are summarized in Table I.

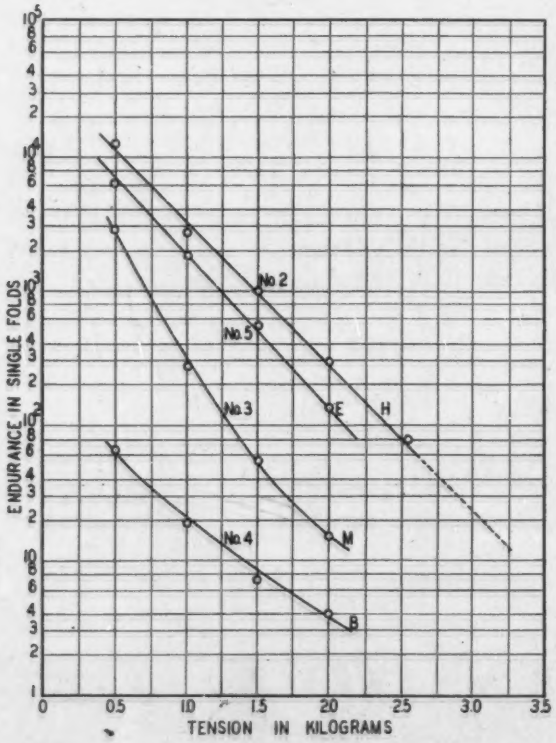

FIG. 4
Log Folding Endurance vs. Tension
Machine Direction

From these data it was evident that the machine was not constructed with the accuracy expected of a precision instrument. Instead of tolerances of the order of 0.01 to 0.04 inch, it would seem that a tolerance of 0.001 inch or less should be adopted. There was a noticeable amount of play in the mountings of both the upper and lower assemblies. The brass guides had a steering effect in guiding the meeting of the anvils and, as a result, they were worn appreciably.

The specimen clamps frequently allowed the specimen to slip. This perhaps could be remedied or at least improved by increasing the eccentricity of the shaft (5 in Fig. 3) and lengthening the clamp arms (6) in order to give an increased mechanical advantage and thereby enable the operator to apply greater pressures to the test strip without undue effort. As the clamps were constructed, they did not function at all with papers of high caliper. It was practically impossible to hold a 16-point board firmly in the jaws. This is a disadvantage because it limits the use of the machine. A suggested remedy would be to operate the clamps with a screw instead of depending on the friction of the eccentric shaft.

The folding pins were efficient for papers of low and medium stiffness, but were too weak to handle stiff papers properly.

The counters operated satisfactorily in general. Occasionally the set screws in the counter arms loosened despite firm tightening.

The speed of the machine is 84 single folds per minute. The total loading time is 3.5 minutes for the 10 heads. This includes the time necessary to:

1. Remove the broken test strips
2. Record the number of folds for all ten heads
3. Reset the counters to zero
4. Put in and clamp the new test strips
5. Start the machine.

Theoretically, the fold results from all heads should be the same. If this were true, the machine would be a great time saver since, with most other folding devices, the average of only 10 determinations is reported as the folding endurance value. However, because of the fact that there were differences among the 10 heads, it seemed advisable in the present work to run at least 10 strips, preferably 20, on each head to obtain a more truly representative fold value. At the beginning of the work, head 7 was found to be out of alignment i.e., the lower jaw did not meet the upper jaw correctly but hit the brass guides, the friction being great enough to lift the upper jaw assembly so that the anvils of the upper and lower jaws did not meet. A shim approximately 0.006 inch thick was placed behind the bracket holding the upper assembly in place in order to force the entire assembly out far enough so that it would meet with the lower jaw. Although this device seemed to help some, the head continued to give results which were not in close agreement with the others and, hence, results from this head were disregarded. However, after running approximately 325,000 folds on each it was found that head 7 seemed to have returned to normalcy and that head 6 gave high results.

Effect of Tension

During the investigation of the Schopper bending endurance tester *(1)*, it was observed that for many

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papers there was an approximately linear relationship between the log of the bending endurance and the tension applied to the test strip. In order to determine whether a similar trend would appear in the results of the multiple fold tester, four different types of paper were tested with tensions of 0.5, 1.0, 1.5, and 2.0 kg., respectively. The results are tabulated in Table II and are plotted in Fig. 4. As was the case for the bending endurance tester, an approximately linear relationship existed between the log of the folding endurance and the tension for papers of relatively high endurance, whereas for weaker papers the curves departed from linearity and developed a rather characteristic curvature with the convex side toward the origin. In considering any of the data obtained with the multiple fold tester, it should be remembered that the results are recorded by the instrument and in this report in terms of single rather than of double folds. In other words, when a fold endurance of 500, for example, is recorded, the specimen has been creased 250 times in one direction and 250 times in the opposite direction, whereas the same figure as applied to the other fold testers commonly used would represent 500 folds in each direction.

Effects Due to the Mass

The weight of the upper assembly may be related to the creasing pressure in at least two ways. In the first place, under static conditions, the pressure upon the specimen obviously would be directly proportional to the weight of this assembly and, hence, to its mass. However, since the test is dynamic, it is also conceivable that the inertia of the upper assembly would add to the pressure, because the force required to accelerate this mass would be accompanied by an equal and opposite force exerted upon the specimen. The actual magnitude of the latter force would be equal to the product of the mass times the acceleration of the assembly. The acceleration would depend, among other things, upon the thickness, stiffness, and compressibility of the specimen, and these properties undoubtedly would change during the course of the test.

Since it was not feasible actually to measure the acceleration, the problem was approached on a statistical basis. First, an attempt was made to vary the speed of the driving motor by means of a voltage regulator. Theoretically, reducing the speed should decrease that component of the creasing pressure which is due to acceleration of the upper assembly. However, the characteristics of the driving motor were such that this approach was found to be impractical.

Another possibility, however, lay in reducing the weight of the upper assembly. Although it was realized that this would change not only the dynamic, but also the static effects, it was felt that data so obtained would be enlightening.

It was found that by removing the round weight and bushing on the top assembly, and by substituting a strip of sheet iron to act as a stop to prevent the assembly from dropping out of its fitting, the total mass could be reduced slightly more than 50%. It was suggested that only one head be so modified and that only two heads be used in running a series of papers: one being the modified head and the other being an unaltered head. Two heads, 3 and 9, were used, head 3 being reduced in weight from 514.9 grams to 252.3 grams. This reduction would involve a factor greater than two so that the change in dynamic and/or static effects should be noticeable.

Three papers were run on these two heads. All test strips were cut in the machine direction and were run at two kg. tension. The results are presented in Table III.

TABLE III.—EFFECT OF CREASING PRESSURE

Sample Number	Type of Paper	Head 3 252 g.	Head 9 515 g.
1	Rag-content bond	53	58
2	Ledger	23	12
3	Mimeograph bond	5.6	5.0

Because these results were not consistently high for head 3 and because the head 9 results, which should have been normal, were much lower on all papers than the results previously obtained (*see* Table I), it was decided to run a set of folds using all 10 heads (still leaving head 3 modified) with the rag-content paper which had been used for calibration work at the beginning of the work on this instrument.

The results of this third calibration run, presented in Table IV and dated November 1, 1939, were surprising. The results from heads 3 and 9 were for practical purposes identical with the average of all 10 heads. It was also noticeable that the results of head 7 were not so far out of line as the previous runs had shown. Most surprising of all, however, was the fact that the average value for all heads was only half as great as the values previously obtained. These results seemed to indicate that some factor other than the inertial effect of the upper head was acting, and acting with such force as to overshadow completely any inertial or pressure effect that might be present due to the mass of the upper head.

Another run with the calibration paper using only the two heads, 3 and 9, was made immediately. The results obtained checked roughly those previously obtained when only these two heads were used (*see* Table V).

TABLE V.—EFFECT OF CREASING PRESSURE—SAMPLE 1

	Head 3 252 g.	Head 9 515 g.
First trial	53	58
Second trial	46	50

Ledger samples were now run on all 10 heads and again it was found that heads 3 and 9 gave values

TABLE IV.—CALIBRATION DATA—SAMPLE 1

Head Number	1	2	3	4	5	6	7	8	9	10	Grand Average
Initial run April 21, 1939	560	606	602	583	601	649	719	600	626	537	608
Second run May 9, 1939	526	652	631	557	635	677	829	589	683	552	633
Third run Nov. 1, 1939	274	295	305*	295	288	312	325	303	311	295	300

* Head 3 was of modified construction during the third calibration (*see* text).

TABLE VI.—CALIBRATION DATA—SAMPLE 2

Head Number	1	2	3	4	5	6	7	8	9	10	Grand Average
Initial run May 12, 1939	265	303	332	310	282	337	357	314	260	249	301
Latest run Nov. 3, 1939	135	160	159*	165	150	167	171	166	161	153	159

* Made with head 3 modified (*see* text).

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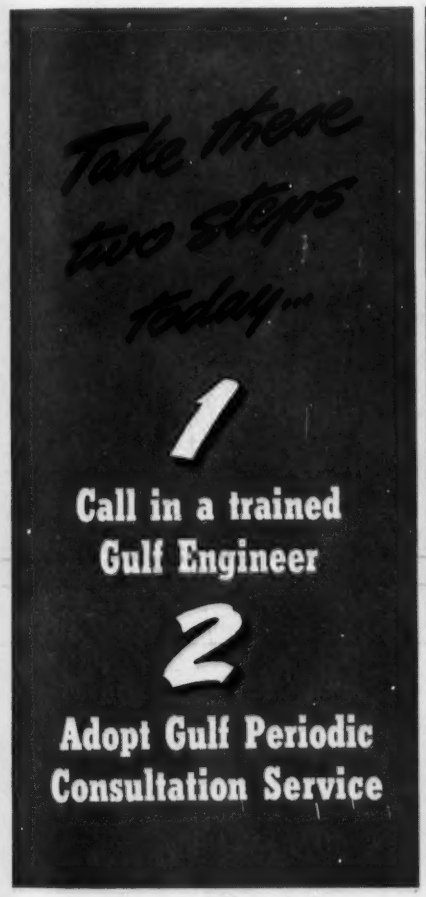

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very close to the average—just as close, in fact, as any other head. The average result of this run was 159, whereas that of a previous run was 301 (with head 7 omitted, 295). *See* Table VI.

The data in Tables IV and VI seem to offer conclusive proof that the machine had changed, since the results obtained after approximately 500,000 single folds had been made by each head were about half as large as those previously obtained. Unpublished data previously obtained by Clark suggest that this behavior might have been due to a small increase in the operating speed during the course of the investigation.

The papers used in these tests were at all times kept in the constant humidity room. Calibration results of three other fold testers using other standard papers are shown in Table VII. All the tests were made during the same period. These calibration data demonstrate that the discrepancies in the results of the multiple fold tester must be attributed primarily to changes in the instrument itself and not to changes in the condition of the samples. At the time of calibration the spring tensions and, in the case of the Schopper instrument, the roller quadrants were checked and found to be operating in a satisfactory manner.

A second run was made on the ledger paper using only heads 3 and 9. As in the case of the Sample 1 these results checked those previously obtained. The results are given in Table VIII.

TABLE VII.—CALIBRATION FIGURES FOR VARIOUS FOLD TESTERS
(Results are expressed in double folds)

	Instrument		
Date	Sample A	Sample B	Sample C
May 5, 1939	848	931	979
June 1, 1939	975	993	892
July 6, 1939.....	996	1124	1263
August 2, 1939.....	991	1043	1284
August 30, 1939....	990	1369	1268
October 4, 1939.....	886	1062	1594
November 6, 1939 ..	929	1033	1328

TABLE VIII.—EFFECTS OF CREASING PRESSURE—SAMPLE 2

	Head 3 252 g.	Head 9 315 g.
First trial	23	12
Second trial	25	15

Another run was made using ledger paper and only heads 3 and 9, but in this test all the remaining lower jar assemblies were removed from the machine. The results are shown in Table IX.

TABLE IX.—EFFECT OF CREASING PRESSURE—SAMPLE 2

Head	Endurance in Single Folds
3	362
9	248

It will be observed that this change increased the apparent fold endurance values to such a degree that they exceeded the latest figures previously obtained on the same paper, using all ten heads (*see* Table VI).

Since the various heads are theoretically independent in their action, this effect was rather puzzling. One plausible explanation, however, might be that the removal of eight of the 10 lower assemblies changed the downward speed of the supporting bar during a critical part of the cycle. The end cams are so constructed that the tension is applied to the strips at relatively low velocity, but it had been observed during other work that the tensile strength of paper specimens is sensitive even to any slight shock or vibration which occurs during the test. In order to observe the action of the instrument to better advantage, tests were run under various conditions, during which the only illumination was provided by flashes from a variable frequency stroboscopic lamp. By this means, it could be seen that the gears driving the cams did not revolve at a constant speed, but at speeds which varied considerably at certain parts of the cycle. This behavior presumably was due both to play in the speed reduction gears and to the nature of the speed-load characteristics of the driving motor. It is not difficult to imagine therefore that differences in the load would affect the magnitude of this variation and hence the rate of application of the tensile stress.

It was noticed also during these observations that the instrument vibrated considerably under all conditions of operation but somewhat more when all 10 of the lower assemblies were installed than when only one or two were in place. Presumably, the degree and nature of this vibration would also change during normal operation, depending upon the number of strips still folding. In view of the effects of shock during tensile strength determination mentioned above, the importance of such behavior cannot be disregarded.

It will be recalled that operation of two heads alone in the case of the ledger paper, sample 2, caused a reduction in number of single folds from 160 to 12, a factor of about 13. By means of the curve given in Fig. 4, it is possible to estimate very crudely the effective tension which would have been required to cause rupture in the case of this sample after 12 single folds under normal operating conditions. The extrapolated value is 3.3 kg. In other words, according to the hypothesis suggested, the combined effects of speed variation and shock are equivalent to increasing the tension applied by a factor of about 1.6. Because of error due to wearing of the machine and to extrapolation of the curve, only qualitative significance should be attached to this figure.

Although the explanation of this behavior leaves something to be desired, it was not considered within the scope of the current work to investigate the matter further. It is obvious, however, that the units do not act independently and that comparable results could never be obtained unless the same number of heads were always used. Furthermore, on two samples having the same average folding endurance as measured by the Schopper or the M.I.T. tester, the one having the poorer formation would, in general, give the lower result on this instrument, since the breaking of the weaker strips would subject the stronger specimens to undue stress.

TABLE X.—PHYSICAL CHARACTERISTICS OF TEST SAMPLES

Sample	Paper	Basis Weight 17x22—500 lb.	Caliper in.	Apparent Density Basis Weight ÷ Thickness mils
1	Rag-content bond	13	0.0029	4.48
2	Ledger	25	0.0044	5.68
3	Mimeograph bond	21	0.0045	4.67

By a similar deduction, the reproducibility of results on a given paper in a single run should be relatively good, since it would be impossible for one specimen to continue folding very long after the others had broken. It would seem, however, that accuracy should not be sacrificed for the sake of uniformity if the test is to be of ultimate value.

There remains the question of why the ledger paper alone gave the results it did when only two heads were used—i.e., results in which head 3 gave appreciably greater fold values than head 9 (almost

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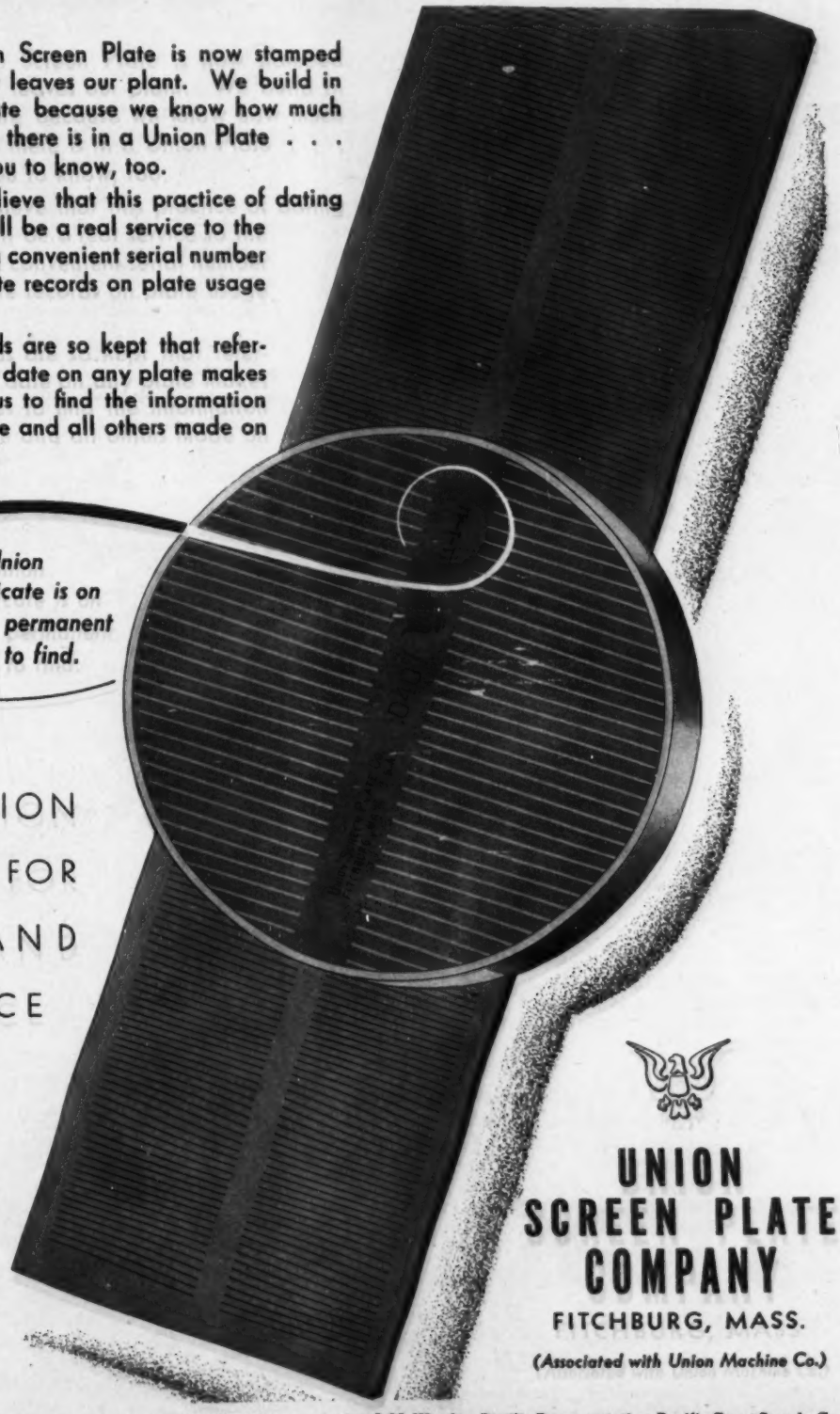

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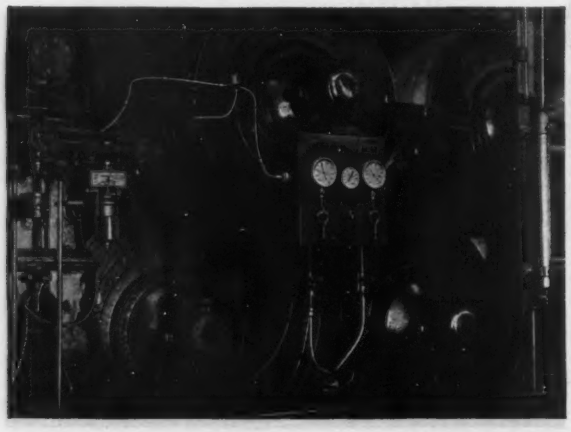

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Stickle Control means a saving of up to 20 per cent in the amount of steam per ton of paper dried. Its use reduces cockling, curling, and shrinking—and greatly reduces drier snap-offs. These advantages give a worth-while increase in production and make possible a more uniform quality. They eliminate handicaps to maximum production performance.

Stickle Control stabilizes steam flow and supplies close control of moisture. It is installed on a guarantee to control moisture within a variation of one-half of one percent. Reports from some mills where Stickle Control is being used indicate that it does considerably better.

The new Stickle Tension and Thermal Control is already widely used. The illustration above shows one of three installations now in use in a mill making high grade sulphite bonds and ledgers. An investigation will uncover facts which will be of great interest to you.

Without obligation to you, one of our field engineers will check with you on your drying problems. Ask for Bulletins 60 and 60C for more detailed information.

STICKLE

STEAM SPECIALTIES COMPANY

2235 Valley Ave. INDIANAPOLIS, IND.

twice as great). In an attempt to arrive at some logical solution, caliper values were taken and apparent densities were calculated (*see* Table X). In determining the caliper values, 10 sheets of each paper were measured separately and two caliper readings were taken on each sheet.

The apparent density values show that the ledger was the most compact paper. Perhaps the higher bulk of the other papers was responsible for a cushioning effect during contact with the upper heads so that the amount of weight used was unimportant.

The interpretation of results obtained with varying weights of the upper assembly is complicated by the possible effect of friction upon the movement of the upper shaft in its bearing. This effect can be observed qualitatively by lifting the assembly with one finger, placed first below the center of the jaw, then below one of the anvils. In the latter case, where the thrust is not directly upwards against the center of gravity, the force required to lift the assembly is much greater. Since a similar condition exists during the test, it is reasonable to suppose that the actual creasing pressure would vary with the coefficient of friction between the surfaces involved and with the alignment of the upper and lower assemblies.

Suggestions

It is suggested that the effects of both friction and inertia could be reduced by equipping the shafts with roller bearings and by using springs rather than weights to apply the creasing pressure. Similarly, the use of springs for applying the tension might eliminate some of the effects which have been attributed to variation in this stress.

Literature Cited

(1) The Institute of Paper Chemistry, *Paper Trade J.* 109, no. 5:35-40 (Aug. 3, 1939).
(2) Clark, James d'A., U. S. patent 2,179,116 (Nov. 7, 1939).

Waste Material Dealers Dine

"We fight to preserve liberty" was the theme of the twenty-ninth annual dinner banquet of the National Association of Waste Material Dealers, Inc.

The banquet, held March 18 evening, concluded a two-day association convention at the Hotel Astor, New York. About 600 were in attendance.

President Louis Lippa, toastmaster, introduced these speakers: Carlton B. Overton, convention committee chairman; David Feinberg, who earlier in the day was elected president of the association, succeeding Mr. Lippa; Clarence H. Low, chairman of the New York Salvage Committee of the War Production Board; George E. Sokolsky, noted author, columnist and radio commentator, and J. M. Johnson, an industry consultant with the Office of Price Administration.

Mr. Low said that there is still too much "lip service" and business as usual. Mr. Johnson declared that despite the daily necessity of conducting business activities, the industry must not lose sight of the fact that the nation is at war.

Banquet committee consisted of Chairman Overton, Sol Ash, Nat. E. Berzen, Sidney Danziger, Wm. F. Ebner, Harry S. Goldstein, Leo Halpern, E. J. Keller, Louis Marcovitz, Julius Muehlstein, Lazarus Muscat, William C. Steck, Lowell S. Thomas, and Paul J. White.

A New Slide Rule

A pocket size "slide rule" selector for electricians, plant maintenance men and others interested in the selection of electric drive equipment has recently been announced by Westinghouse Electric and Manufacturing Company.

To guide in the selection of the proper type of motor for each of 44 industrial applications, a convenient table lists the various uses and indicates which of the four principle types of a-c motor should be selected. The specifications, performance ratings and control classes for the required type is readily determined by making the corresponding setting on the slide.

Information is obtained from the selector by setting the cardboard slide for the proper motor type and then reading its specifications through the window in the acetate envelope. Pertinent facts such as horsepower ratings, speeds, voltages, frequencies, and starting and pullout torques are thus secured. The reverse side of the selector shows which the various magnetic and manual controls are available for each type of motor and lists the proper control number.

This motor and control Electric Drive Selector, SA-714, can be obtained from Westinghouse district offices and distributors.

Inventories Lower

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., March 25, 1942—Taking 1939 at 100 the value of paper manufacturers inventories in January was 134.0 compared with 135.1 in December and 119.7 in January of last year according to the monthly industry survey of the Department of Commerce.

These same figures show that taking January 1939 at 100 the January value of paper manufacturers shipments was 196 compared with 191 in December and 142 in January of last year.

Claimed Not Dutiable

Paper found by the Customs bureau chemists to have more than 6½ per cent ash, shipped from Canada for rotogravure use, is before the United States Customs Court at Los Angeles on the claim of the importer that such paper is duty free as standard newsprint, and not dutiable as printing paper as classified by the officials.

Grinnell Welding Fittings cut minutes-per-weld in pipe erection!

Here are stock fittings made like specialties to give quicker, better welding... to provide speedily-completed joints that pass inspection promptly and remain permanently trouble-free!

Grinnell Welding Fittings are precision engineered from start to finish. They're metal-matched with the pipe or tubing you select... identical in chemical and thermal characteristics... exactly matched in end-thickness. And their accurately extruded outlets and correctly scarfed welding faces insure quick, strong assembly of every joint by means of only simple butt welds.

Specify these better-engineered fittings to save time and trouble on your welded piping jobs. Complete specifications for all sizes from ¾" to 24" are given in Data Book, "Grinnell Welding Fittings". Write for a copy. Grinnell Company, Inc., Executive Offices, Providence, Rhode Island. Branch offices in principal cities of U. S. and Canada.

WELDING FITTINGS BY GRINNELL

WHENEVER PIPING IS INVOLVED

Government Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., March 25, 1942—The Government Printing Office has received the following bids for 30,000 pounds of 29 x 41 buff offset book paper; Paper Corporation of U. S., 9.2 cents; R. P. Andrews Paper Company, 8.79 cents; Stanford Paper Company, 9.25 cents; Mudge Paper Company, 9.3 cents; Butler Company, 9.59 cents.

For 12,390 pounds of 100% rag, 17¾ x 36¼ white recording chart paper; Whitaker Paper Company, 39.5, 35, 37.5 and 33 cents; Walker Goulard Plehn Company, 39.5, 35, 37.5 and 33 cents; Mudge Paper Company, 26.85 cents; and R. P. Andrews Paper Company, 34.5 cents.

For 19,600 pounds of 50% rag, 32½ x 42 blue index paper; Barton, Duer & Koch Paper Company, 16.38 cents; Walker Goulard Plehn Company, Inc., 16.94 cents; Mudge Paper Company, 17.08 cents; Paper Corporation of U. S., 16.75 cents; and R. P. Andrews Paper Company, 17.07 cents.

For 71,750 pounds of 32 x 42 pink sulphite writing paper; Bulkley Dunton & Company, 8.05 cents; Mudge Paper Company, 8.03 cents; R. P. Andrews Paper Company, 8.24 cents; Whitaker Paper Company, 7.98 cents; Marquette Paper Company, 8.25 cents; Eastern Corporation, 8 cents; Cauthorne Paper Company, 8.25 cents; and Stanford Paper Company, 7.73 cents.

For 100,000 pounds of white sulphite writing paper in 34 inch rolls; Bulkley Dunton & Company, 6.64 cents; Mudge Paper Company, 6.57 cents; Paper Corp. of U. S., 7.6 cents; R. P. Andrews Paper Company, 6.68 cents; Whitaker Paper Company, 6.48 cents; Marquette Paper Company, 6.54 cents; Barton, Duer & Koch Paper Company, 7.25 cents; Eastern Corporation, 7 cents; Cauthorne Paper Company, Inc., 6.79 cents; and Stanford Paper Company, 6.63 cents.

For 720,000 pounds of 25 x 38 offset book paper; Central Ohio Paper Company, 7.565 cents (200,000 pounds only); Whitaker Paper Company, 7.24 cents; Mudge Paper Company, 7.03 cents (360,000 pounds only); Stanford Paper Company, 7.35 cents; R. P. Andrews Paper Company, 7.1 cents (400,000 pounds only); Barton, Duer & Koch Paper Company, 7.19 cents and 7.8 cents (100,000 pounds only); Marquette Paper Company, 7.15 cents; D. L. Ward Company, 7.56 cents (120,000 pounds only); Aetna Paper Company, 7.56 cents (120,000 pounds only); Butler Company, 7.2 cents; and Bulkley Dunton & Co., 7.03 cents (360,000 pounds only).

For 80,000 pounds of supercalendered book paper in 28½ inch rolls; Marquette Paper Company, 6.383 cents; R. P. Andrews Paper Company, 6.64 cents; Mudge Paper Company, 6.38 cents; Paper Corporation of U. S., 7.02 cents; and Barton, Duer & Koch Paper Company, 5.85 cents.

For 400,000 sheets of 22 x 34 white gummed paper; Paper Corporation of U. S., $12.849 per M sheets; Graham Paper Company, $14.15; Virginia Paper Company, $15.00; Eureka Specialty Company, $13.52; Bradner Smith & Co., $15.20; Barton, Duer & Koch Paper Company, $14.25; Stanford Paper Company, $14.60; R. P. Andrews Paper Company, $15.37; Mudge Paper Company, $15.90; and Whitaker Paper Company, $13.87.

For 190,390 pounds of 35½ x 55 jute tag board; Walker Goulard Plehn Company, 11.13 cents; Old Dominion Paper Company, 11.238 cents; Whitaker Paper Company, 10 cents; Paper Corporation of U. S., 10.94 cents; Mudge Paper Company, 11.25 cents; and Hollingsworth & Whitney Company, 6.25 cents.

For 36,900 pounds of 50% rag, 44 x 56 litho finish map paper; Paper Corp. of U. S., 16 cents; Walker Goulard Plehn Company, 16.48 cents; Graham Paper Company, 15.5 cents; Stanford Paper Company, 15.5 cents; and Collins Manufacturing Company, 16.25 cents.

WASHINGTON, D. C., March 25, 1942—Walker Goulard Plehn Company has been awarded the contract for furnishing the Government Printing Office with 36,750 pounds of 50% rag, 32½ x 42 yellow index paper at 17.25 cents. Other paper awards announced by the Printing Office for bids received during the past couple of weeks include the following:

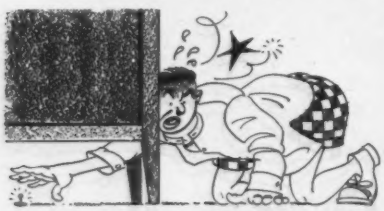
Barton Duer & Koch Paper Company will furnish 249,000 pounds of 35 x 45 machine coated book paper at 6.2 cents and the Whitaker Paper Company will furnish 39,600 pounds of 50% rag, 10½ x 16 white M. F. lithographed paper at 14.3 cents. The same firm will also furnish 114,380 pounds of 10½ x 16 M. F. lithographed paper at 14.3 cents.

Walker Goulard Plehn Company will furnish 19,902 pounds of 50% rag, 32½ x 42 salmon ledger paper at 17.05 cents while the same firm will also furnish 17,027 pounds of 50% rag, 38 x 48 white ledger paper at 16.10 cents.

Stanford Paper Company will furnish 259,000 pounds of 50% rag, 36 x 48 litho finish map paper at 15.50 cents and the Old Dominion Paper Company will furnish 203,986 pounds of 32 x 42 white sulphite manifold paper at 11.9597 cents.

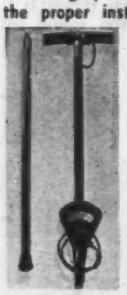
Marquette Paper Company will furnish 33,800 pounds of 28 x 41 dull coated book paper at 8.65 cents and the Mudge Paper Company will furnish 11,000 pounds of 25% rag, 36 x 48 yellow bond paper at 16.7 cents. Old Dominion Paper Company will furnish 12,000 pounds of 25% rag, 22 x 34 salmon bond paper at 14.65 cents.

R. P. Andrews Paper Company will furnish 240,784 pounds of white sulphite writing paper, 40 x 53½, at 8.89 cents and the Paper Corp. of



YOU GOTTA GET IT!

It is mighty inconvenient if you do not have the proper instrument. That is why regular temperature checking of the rolls in the drying train is so often neglected. A Cambridge Surface Pyrometer, however, makes temperature checking easy. Its accurate, convenient, quick-acting indications fairly invite regular use. This routine checking will help avoid the most common cause of spots, wrinkle, curl and blisters.



Write for bulletin 1945.

The Cambridge is made in a hand model and with the extension attachment to reach those hard-to-get-at places.

CAMBRIDGE INSTRUMENT CO., INC.
3732 Grand Central Terminal, New York, N. Y.

CAMBRIDGE
SURFACE PYROMETERS

U. S. will furnish 235,092 pounds of 32 x 52½ wood manila paper at 5.48 cents. Mudge Paper Company will also furnish 14,450 pounds of 100% rag, 17 x 22 white litho finish chart paper at 23.48 cents. Same firm will also furnish 44,000 pounds of 100% rag, 36 x 54 white litho finish chart paper at 23.48 cents. Cauthorne Paper Company will furnish 350,000 pounds of telephone book news paper in 28 inch rolls at 5.15 cents and Bradner Smith & Company will furnish 123,825 pounds of 42½ x 64½ white sulphite writing paper at 8 cents.

Paper Corp. of U. S. will furnish 36,750 pounds of 50% rag, 32½ x 42 buff index paper at 16.4 cents and the same firm will also furnish 14,900 pounds of 50% rag, 32½ x 42 green index paper at 17.1 cents. Same firm will furnish also 18,675 pounds of 50% rag, 32½ x 42 white index paper at 15.7 cents. Paper Corporation will also furnish 29,800 pounds of 50% rag, 32½ x 42 white index paper at 15.7 cents.

R. P. Andrews Paper Company will furnish 7,938 pounds of 100% rag, 29 x 41 white M. F. book paper at 20 cents and the Mudge Paper Company will furnish 20,000 pounds of 22½ x 28½ jute tag board at 12 cents. R. P. Andrews Paper Company will furnish 1,000 sheets of 100% rag, 24 x 36 white bond paper at $41.00.

Frank Parsons Paper Company will furnish 138,000 pounds of 50% rag, white ledger paper at 17 cents and the Collins Manufacturing Company will furnish 33,500 pounds of 25% rag, 24 x 38 white bond paper at 13.85 cents. Resolute Paper Products Corporation will furnish 25,000 pounds of 25% rag, 24 x 38 white bond paper at 13.7 cents.

Marquette Paper Company will furnish 84,000 pounds of 26 x 34 7.3 cents and Walker Goulard Plehn Company will furnish 287,000 pounds of 32 x 42 white sulphite writing paper at 6.85 cents. Same firm will furnish 160,000 pounds of white sulphite writing paper in 32 inch rolls at 6.6 cents. Old Dominion Paper Company will furnish 50,000 pounds of buff wood bristol board in 20 inch rolls at 5.494 cents.

Paper Corp. of U. S. will furnish 18,900 pounds of 34 x 44 white offset book paper at 7.62 cents and the Marquette Paper Company will furnish 49,250 pounds of 38 x 48½ blue mimeograph paper at 7.75 cents. Barton, Duer & Koch Paper Company will furnish 63,800 pounds of 25% rag, 23 x 36 white bond paper at 13.75 cents and the same firm will also furnish 24,075 pounds of 75% rag, 21 x 32½ yellow ledger paper at 20.5 cents.

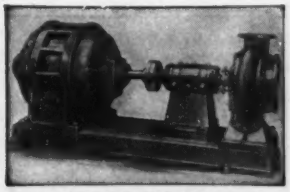
SHUTDOWN *versus* SHOWDOWN . .

a question for YOU to decide!

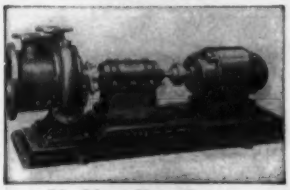
The failure of *one* pump in your mill may cause a shutdown which, even for a short period, can easily result in a loss of hundreds of dollars. Granted, of course, that shutdowns cannot be eliminated entirely but you *can* keep them at a minimum with

WARREN PUMPS

Centrifugal Fresh Water Pumps



Warren Stock Pumps



Machine Chest Pumps

Liquor Pumps

Uninterrupted service, plus low maintenance cost, are two very good reasons why the Chief Engineer in one of our larger paper mills was recently heard to remark, "I never worry about a Warren Pump."

If *shutdowns* are occurring in your mill more frequently than they should, isn't it time for a *showdown* with present pumping equipment?

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS

Customs Cases

A case at Jacksonville, involving the dutiability of jumbo rolls of newsprint which the Customs officials found to bulk materially over 4 points in thickness was partially tried and transferred to New York for further testimony, according to a report made by Warren B. Bullock, manager of the Import Committee of the American Paper Industry. A similar case involving the dutiability of paper in sheets was transferred to New York for trial. In both cases the paper was classified for duty at the printing paper rate of 1/5 cent per pound and 5 per cent, but was claimed to be duty free as standard newsprint.

A case at Jacksonville involving the dutiable value of printing paper was abandoned by the importer when called for trial. The issue was whether or not a commission to the selling agent could be deducted from the dutiable value of the paper.

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger
EDITOR

Vol. 114 March 26, 1942 No. 13

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

A BETTER TAX PLAN NEEDED

The fiscal policy of the Roosevelt Administration has long been subjected to criticism. For the most part this criticism has been of a constructive character and offered with the hope that it would serve to promulgate economy by reducing unessential governmental expenses and more recently to encourage the enactment of a more equitable and larger revenue producing scheme. Unfortunately, no substantial progress has been made in formulating an adequate taxation plan. The government has consistently made the same errors of over estimating the revenue returns and as government expenditures have rapidly increased by billions and billions of dollars, these estimates and the entire taxation plan has lamentably failed to meet the income requirements of the Administration.

Referring to the present status of taxation as "too little and too much", the *Washington Review*, issue of March 16, published by the Chamber of Commerce of the United States says in part: "Since the Treasury presented its important tax proposals to the Ways and Means Committee, open hearings have been held for one week. Diverse views in the Congressional Committee and among witnesses are apparent, with indications that most of the Treasury's specific suggestions for raising additional revenues are coming under fire. It would appear that these suggestions may be held to mean too little taxes from some sources, as well as in the aggregate sought, and too much taxes from other sources, such as corporate and individual incomes. It seems to be accepted that a large amount of new revenue must be raised if the government borrowings from commercial banks, a dangerous source of inflation, are to be kept within bounds."

Continuing, the *Review* points out that, "This is essential if the tax program is not to interfere seriously with the most urgent need of the nation, which is maximum war production within minimum time, and if there is to be continuity of business and private endeavors which produce income. It will be considered fortunate, too, if there is more exploration of the advantages to all from adopting in its basic features a war program of taxation 'for the duration', especially in regard to levies upon incomes. Such a program should be devised to produce maximum yield of revenue, without undue retardation of investment and national production and without jeopardy to features of American life we are fighting to preserve. The utmost contribution can be expected from taxpayers if taxes are widely levied, used in financing the war without gross extravagance, and if other than war expenditures are reduced to the minimum."

Declaring that higher yields are possible, the *Review* goes on to say that, "The maximum yield of a 'duration' tax program could exceed the annual amount the Treasury seeks, if time is given the country to make necessary adjustments. As against an expectation of $59 billion of spending in the next fiscal year, the Treasury proposals seem poorly calculated to meet the need, being likely to produce little over $21 billion in that year, although projected to obtain more than $24 billion. The Treasury program is being criticized from other angles. The proposal to obtain more than $3 billion of new revenues from corporate incomes is held to be excessive in the aggregate and disproportionate in the amount sought from normal as compared to excess profits. Further, the combined effects of the corporation and individual taxes can seriously jeopardize many people who are dependent for their existence upon income from investments in corporate securities."

Referring to new sources of revenue the *Review* states that, "The Treasury seems to have paid little attention to the large volume of revenues that might be obtained from war workers and others who have appreciable increases in their incomes, while it proposes to strike deeply into wages, salaries and other revenues of those who have no such increases, or have decreases, in their incomes and face proportionately a greater lowering in their standards of living. With a few exceptions, the Treasury fails to urge those essential modifications in technical and administrative provisions of the revenue laws which must be made if there is to be equity and fairness in the application of even the present rates of taxes."

In reference to the tax hearings the *Review* states that, "In the hearings before the Ways and Means Committee the Treasury is a continuing witness. Its special representative returns frequently to the stand to discuss subjects in detail. In the course of these proceedings data and procedures being considered by the Treasury, but not included in the original testimony, are brought out. The Treasury's calculations, it appears, are based upon an assumption that corporate income subject to federal taxation will be $17 billion a year. That figure would be away above any earlier year, and may not sufficiently recognize curbs

on profits in war contracts, the efforts many companies will have to make in order to break even, and failures in such endeavors. The $17 billion are estimated after state taxes have been paid. Of the $17 billion the Treasury proposes that $10.4 billion should be taken in federal taxes. Of this amount $400 million a year would be set aside as representing tax taken in excess of 80%, and returned to the paying corporations after the war for use solely for employment and equipment in the transition period."

Commenting on the withholding income tax the article says in part that, "The Treasury estimates that this withholding will cost the Treasury administrative expenses of $10 million a year, and at the request of the Committee it has promised to provide estimates of the cost to employers and others."

A. Jackson Goes with Erving Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., March 23, 1942—Andrew Jackson of 106 Dartmouth Terrace, chief engineer of the American Writing Paper Corporation since 1926, has been appointed general superintendent and assistant to the president of the Erving Paper Company and will assume his new duties Wednesday.

The Erving Paper Company, one of the important industries of Franklin County, is headed by Morris Housen, formerly of this city, as president and treasurer, and his younger brother, David Housen, as vice-president.

The company employs about 400 people and has just installed a new 83-inch sylinder paper-making machine, in addition to the three machines which it already had.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks, 1942		Corresponding Weeks, 1941	
February 7	103.0	February 8	88.6
February 14	103.1	February 15	89.3
February 21	103.1	February 22	90.4
February 28	103.5	March 1	90.5
March 7	102.3	March 8	91.0
March 14 (Prelim.)	*101.3*	March 15	91.8

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1941	85.6	89.7	92.2	96.0	98.7	99.3	94.2
1942	103.8	*103.3*	...	...	...	...	...

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1941	101.0	99.7	105.2	106.2	100.4	97.4
1942	...	...	...	...	...	...

COMPARATIVE YEARLY SUMMARIES

	1935	1936	1937	1938	1939	1940	1941	1942
Year to Date	67.0	76.7	89.2	66.4	78.9	86.6	88.1	*103.2*
Year Average	69.9	80.4	79.8	71.5	83.4	85.6	97.4	...

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS †

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1937	80	86	86	88	85	77	66	74	69	65	55	45	73
1938	54	60	61	57	58	56	57	66	66	70	65	59	61
1939	60	67	71	69	64	67	63	72	74	84	81	71	70
1940	71	70	69	70	76	79	72	74	72	79	77	71	73
1941	75	81	82	83	84	88	86	94	94	99	98	93	88
1942	102	*101*	..	..	..	..	..	..	..	..	..	..	..

Week ending Feb. 7, 1942—101
Week ending Feb. 14, 1942—101
Week ending Feb. 21, 1942—102
Week ending Feb. 28, 1942—100
Week ending Mar. 7, 1942—101
Week ending Mar. 14, 1942—*100*

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

EXPORTERS
OF AMERICAN PULP

TO
BRITAIN
SOUTH AMERICA
AND ALL WORLD MARKETS

LYDDON
& COMPANY
(AMERICA) INC.

51 EAST 42ND STREET
NEW YORK CITY

ARE YOU IN A POSITION TO HELP WIN THE WAR?

yes!

Give these questions careful consideration:

1 Supplies of burlap are dwindling. Can you save material and money by buying soda ash in paper bags?

2 Conversely, the war effort will require about 30% of our paper output. Can you purchase soda ash in box or hopper cars, unloading to be effected with mechanical or air conveyor systems?

3 Steel is the main sinew of war. A 760-lb. drum of solid caustic or a 400-lb. drum of flake caustic consumes 18 lbs. of steel. Can you buy your caustic soda for delivery in tank cars of 50% liquid caustic?

4 Scrap steel is of great value to our national economy and worth good money to you. Are you disposing of it to the best interests of our war effort?

5 Shipments of 50% liquid caustic are being made at an unparalleled rate. New tank cars are becoming difficult to secure. The equipment now on hand can be used more advantageously to carry 74% than 50% liquid caustic. Can you change to 74%?

Help win the war. Write the nearest Michigan Alkali office or any other conveniently located alkali manufacturer for full information and advice on changes in handling equipment.

MICHIGAN ALKALI COMPANY

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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Paperboard Defects and Some Remedies*

By Pierre Drewsen [1]

Abstract

Manufacturing specifications are considered as working agreements between manufacturers and consumers. The variable nature of manufacturing processes and the necessity for their control is implied in the adoption of tolerances. Defects are defined as any failure of a product to fall within the permitted tolerance. Some of the more common paperboard defects, inherent in both the paper and the roll stock, are discussed together with suggested remedies. The importance of increasing the present collection of waste paper is stressed as being the most important influence in improving paperboard quality and production.

Defects in paperboard may be thought of as including deficiencies in the uncombined paper, in the roll stock, or in the combined board. This subject is especially important today because of war-production requirements, and because defects cause waste. Since practically everyone is familiar with the fact that our present paperboard production and consumer paperboard demands are greater and more critical than ever before, and that neither raw material supply nor mill capacity is at the moment adequate to supply these wants, it will not be necessary to emphasize this point again.

Defects or deficiencies in uncombined paper board may be conveniently classified as general and special. General defects may be thought of as including deficiencies or excesses in weight, thickness, moisture, and color, as well as inadequacies in strength, stiffness, sizing, appearance, and the like. The maintenance of these characteristics constitutes the essence of routine paper manufacture, and the control of these qualities should be a matter thoroughly understood. It is convenient to think of the requirements of customer and carrier as the primary factors which govern quantitatively both specifications and their permitted tolerances.

Container and Box Specifications

The quantities mentioned are variables; and variables imply that tolerances satisfactory to the carrier or customer must be permitted. For example, a number of paperboards are required by Rule 41 of the Consolidated Freight Classification to weigh at least a certain number of pounds per 1000 square feet of area, to measure at least some thousandths of an inch in thickness, and to have a minimum bursting strength of so much. These are the rules of the railroads, and failure to meet them in the finished box subjects the shipper to a penalty of 20% extra freight charges. Tolerances in Rule 41 in these respects are taken care of by expressing the necessary qualities as minimums. Thus, the present version of Rule 41, dated January 31, 1942, provides requirements for a number of grades of boxes, in which, for each increment in the combined weight of box and contents, an increase is demanded in combined dimensions, combined thickness of facings, and bursting strength; the experience of the industry being that all use requirements can be met by these specifications. There is nothing, of course, to prevent any mill from making any unusual grade of board for some special purpose, if needed.

Specifications for any product are, in general, measurements of necessary qualities agreed upon between a manufacturer and a customer. In a sense they are a compromise between what the manufacturer can make and, in the case of corrugating paper, for example, what the paper boxmaker must have. Now, the recognition of the variable nature of manufacturing processes of any kind, including paper manufacture, by the customer, lies in his acceptance of tolerances. Any deviation from the specifications, or agreed upon qualities, or the sales contract, greater than the tolerances permit, constitutes a defect or a deficiency.

At this point we begin to encounter special, as distinguished from general requirements. Corrugated paperboard must be, according to Rule 41, not less than 0.009 inch thick, and must be of a *quality sufficient to produce finished board of adequate rigidity*, to use the exact wording of section 2. Nothing is said about moisture content or weight basis. As a rule, paper mills like to run a sheet slightly on the high side of the permitted weight tolerance for the reason that the ton is the unit basis of costs, and a mill likes to make as many quality tons as possible. On the other hand, the paper boxmaker is not primarily interested in the tons of corrugating paper he consumes, but rather in the area of corrugated board and, therefore, the number of finished boxes his machines turn out. Naturally, therefore, there is room for some difference of opinion, and the need for specifications is obvious.

As regards moisture content of corrugating paper, if the sheet on the reel exceeds about 12%, the slitters may trim a sheet with a ragged edge, although the rolls may wind up beautifully. On the other hand, if the moisture content runs in the 5% range, the slitters function well, but the resulting stiffness of the sheet may produce soft rolls in rewinding. The converter

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usually finds that a sheet with excess moisture content corrugates well, but he objects on general principles to paying for excess moisture, and for the extra steam required in drying, and probably also for the reduced speed of his combiner. He also objects to a sheet which is too dry because it tends to spring out of the corrugating rolls in spite of steam showers or other moistening devices. When a corrugator operates in excess of the speed which the moisture content of the sheet permits, dropped corrugations are the result and this means crushed and crumpled areas of great weakness within the double-faced paperboard. In either moisture extreme the fault lies with the mill. It is evident that an agreement must be reached between the supplier and the consumer on moisture content, even though two consumers may differ.

Special Requirements

Here is where special requirements enter the picture. Some corrugators are satisfied with 7% moisture while others require a higher moisture content. Special requirements of this nature may be the result of compromise and may depend on equipment limitations, on the relative skill of the plant operators, on the nature of the product and the business, and probably on many other factors.

General Requirements

The control of most of the general requirements mentioned is so well known that any discussion, such as the regulation of basis weight, would be superfluous. The control of certain other factors, however, is not so simple a matter. Waste paper as the raw material for paperboard introduces the problem of surface defects, the most common of which are, perhaps, asphalt specks. These are derived from asphalt laminated paper and from asphalted paper tape sometimes used on the manufacturer's joint on a corrugated box. Besides marring the appearance of paperboard, asphalt specks, like rubber, glass, wood, and metal particles, reduce the bursting strength of the paperboard. At the moment there is no commercial remedy for this defect, in the sense that there is any economical process for removing them. The only thing that can be done is to exercise care to keep as much asphalted broke as possible out of the breaker beater, using extra men if necessary, and then processing the stock in the best possible settling basins and screens.

Microorganisms

Slime spots are another type of surface defect which, fortunately, are well understood. Slime has been the subject of a number of recent papers. The nature of slime is biological and the remedy is a toxic agent which will kill these microorganisms before they find an opportunity to gather into masses which break off and find their way into the fiber formation. In spite of the fact that there are a number of chemicals on the market which will remedy this condition, the solution is not always simple for the reason that it is difficult in many cases to estimate the nuisance value of slime, and to convince the mill management of the desirability of spending a sum of money on its elimination. In other words, slime elimination in each individual case must stand the scrutiny of the financial department before any elimination process will be approved.

Finish

Finish is defined by *The Dictionary of Paper* as "the surface property of a sheet determined by its surface contour and gloss. It is a property which is usually determined by inspection". The implication is that the degree of finish is estimated by comparison with some existing product which has been selected as "standard" for a particular purpose. In paperboard manufacture, finish is not a matter of exact measurement. Since waste-paper material is variable in quality it tends to cause variations in finish, hence the quality of waste used must be properly selected. In general, as the pressure on the stack rolls increases, finish, in the sense of gloss, tends to improve, but the strength of the paperboard diminishes as fiber cuts fiber. The effect of water on the calender rolls in giving a gloss finish is well known. As the life of a felt approaches its end and the nap wears off, felt marks may appear on the sheet surface. The effect of lumpy and undefibered stock is obvious. If the liner stock is "too long" and there is not enough of it, then the filler may show through in places.

In box manufacture finish is particularly important where printing is involved, and there is nearly always some printing on a box. As the fibres become "shorter", the sheet becomes more closely formed, which is to say that the voids diminish, in size if not in volume, and this reduces absorbency, if all other characteristics remain unchanged. Now, printing inks sometimes vary in penetrating quality, and if such a variation takes place at a time when a paperboard, variable with respect to absorbency, is being printed upon, printing trouble may be expected, and if serious enough, a "defect" results. Means of controlling the sheet surface from a printing standpoint include regulation in the jordanning of the stock, the use of surface fillers such as starch, or polyhydric alcohols in the waterboxes, and also, perhaps, a better selection of inks.

Size

In general, all paperboard products are rosin sized to some extent, except corrugating materials, and even in these sizing is often desired for special reasons. In paperboard manufacture, sizing means waterproofing, as distinguished from Witham's more general definition of making a porous surface less so. In paperboard, a moderate degree of sizing is desirable, particularly in container liner, because a slack-sized sheet takes printing better, and "dries" more rapidly; also, because the adhesion of the corrugated arch to the liner, as well as the sealing of the finished box itself, particularly when this is done on a production line with automatic sealing machines, is accomplished more uniformly and dependably without an excess of the effect of rosin and alum. The paperboard manufacturer uses some empirical test for sizing, which has the virtue of rapidity or ease of operation, in preference to one of the standard methods, which are sometimes objected to when tried in the machine room. The "water-bucket" test is usually employed in one form or another, and for rapid tests, floating a sample strip on water at 185 deg. F. has much to commend it, though such a test is difficult to standardize in a satisfactory manner.

Other Defects

In addition to the foregoing, there may occur still another defect which usually is more troublesome than anyone of these mentioned, and that is the result-

ant effect of two or more of them. If, for example, a sheet is substandard as regards moisture, and if, at the same time its weight basis and caliper vary appreciably across the face of the sheet, the converter is in for some real trouble. Usually the only thing he can do is to slow down the machine, or in extreme cases, remove and reject the offending roll. Such a condition is not always evident from routing tests in which one- or two-square-foot samples are cut and measured. Often such difficulties may be traced to defects in the roll stock, as distinguished from the paper itself, and a short discussion of this topic may now be in order.

One roll-stock defect, not too infrequent, is poor rewinding. When rolls are too soft, as may be caused by low moisture content, and by the inability of the mill rewinder to draw up the stiff paper tightly enough, there may be insufficient internal friction to keep the paper "in line" as it unwinds on the converting plant mandrel. In this case it weaves first one way, then another. There is nothing to do in such a case except to put on clamps to prevent this movement, and then increase the friction and slow the machine down. Too much wax size, or the presence of paraffined paper in the raw material has caused this trouble which is known as telescoping.

When wood bungs are driven into the finished roll the edges crack locally and usually make it necessary for the converter to discard some of the paper on the interior of the roll. Wood plugs, too, support only the ends of the roll, and make it possible for the roll centers to collapse, usually when the roll is dropped from a hand truck, thereby making it practically impossible to insert the mandrel. Full-length cores of paper or metal offer a certain escape from this difficulty, but cost more. If the shipping distance is not too great, and if the handling of the rolls is not too rough, wood plugs may be used economically, but the extra expense of full-length cores may often be well worth while.

Rolls which have collapsed in this manner, or otherwise rendered eccentric may cause trouble on the combining machine because the paper tends to wrinkle, and to break when friction is applied. Such rolls are sometimes possible to run when heavy friction causing a back pull, is applied to the paper, but this is merely a compromise solution, and is certain to result in the use of excess power.

Another form of rough handling of roll stock is to insert the toe of a truck under the edge of an up-ended roll just before moving it. When this is done violently, the blow will crack the edges in spite of metal straps placed there for protection. Of course, heavier straps may be used, but a more satisfactory remedy would appear to be less roughness.

Sometimes backtenders wet the paper as it begins to wind on a roll, in order to start the rewinding successfully. A converter may agree not to complain about such a practice in order to improve rewinding at the cost of a small amount of paper on the interior of the rolls. However it is preferable to avoid this practice if possible.

Storage of up-ended roll stock on a damp or wet floor will cause moisture absorption on one edge. If at the same time the upper edge dries out, the converter will be faced with a roll one edge of which has expanded and the other contracted, and will encounter some real trouble.

The suggestion has been made that all roll stock be trimmed one sixteenth of an inch full in order to allow for a possible shrinkage in storage. Since roll stock is usually carried in sizes of one or two inches apart, a slight shrinkage of a roll where an exact size is needed may make it necessary to use a roll of the next larger size, which would result in wasting one or two inches of trim. In the 30-inch range this would cause from 3-6% more waste than normal.

In combining paperboard to make single- and double-face, too heavy a pressure on the press roll, where the liner meets the tips of the silicated corrugated arches, may crush the corrugated paper and cause it to peel easily from the liner. If this happens with one liner but not with the other, the remedy is obvious. Dropped corrugations, which have been mentioned, and other defects which occur at or after the combining operation, are at least three times as wasteful as those occurring in preceding operations, because three layers of paperboard are involved.

Conclusion

The above possible defects in paperboard probably do not even approximate a complete list. A number are doubtless due to equipment shortcomings, or to the lack of modern-control devices. It is believed that these are being taken care of as rapidly as it is possible to make the replacements and acquisitions. There is, however, one present and obvious cause of defects which improvements in plant equipment will not do much to eliminate, and that is the waste-paper situation. Anyone who has tested paperboard, even intermittently, during the past few months has no doubt observed the quality of waste-paper material becoming poorer and poorer. The only remedy for this is more collection, and the only way to bring this about is to educate the American people to the urgency of the situation, and to instruct them, particularly through units such as Red Cross Chapters, Girl- and Boy-Scout troops, school officials, and church parishes, what the various grades of waste paper are, the best means of moving them to the mill, and how to earn some money while doing so. It is our firm conviction that many defects will disappear, and that both production and quality will improve when sufficient waste paper is gathered to keep our paper mills running full time. It is hoped that everyone connected with the paper industry will give this urgent matter some thought and then do something in his own community to improve the situation.

TAPPI Notes

Edgar Turnbull formerly of the Wardlow-Thomas Paper Company is now technical superintendent of the Champion Paper and Fibre Company mill at Hamilton, Ohio.

The next meeting of the New England TAPPI will be on April 17, 1942.

Joseph J. Thomas formerly of Rohm & Haas is now in the research department of the S. D. Warren Company, Cumberland Mills, Maine.

The Niagara Falls District of the Empire State TAPPI will meet at Niagara Falls, N. Y., on April 25, 1942. F. J. Lang, Manager of the No. Tonawanda Mill of the International Paper Company will have charge of arrangements.

The Empire State TAPPI will be hosts to the New York-Canadian Div. of the Superintendents Association at the Hotel Syracuse, Syracuse, N. Y., on May 15-16, 1942.

The Lethal Effect of Drier Rolls upon Bacteria*

By John W. Appling[1] and B. F. Shema[2]

Abstract

The lethal effect of drier rolls has been studied by inoculating the wet web of an experimental Fourdrinier machine with known species of bacteria, by determining the bacterial content of peel-off liners from four types of paperboard, and by determining the heat resistance of five different cultures of spore-forming bacteria in vitro *and in paperboard.*

When the wet web of a Fourdrinier machine was inoculated with Escherichia coli *(a heat-resistant strain),* Serratia marcescens, Staphylococcus aureus, Aerobacter aerogenes, *and with mixed suspensions containing the first three nonspore-forming species in addition to* Bacillus mycoides *(a spore-former), it was found that only the spore-forming species survived the drier rolls.*

Large numbers of bacteria were found in both top and bottom liners when these were made from highly contaminated stock, such as waste paper. The drier rolls did not have sufficient lethal effect to sterilize highly contaminated stock, although it was heated by direct contact with the rolls.

The extraordinary resistance of spore-forming bacteria to moist heat in vitro *and in paperboard pointed to the following conclusions: 1. Spore-forming bacteria, such as* Bacillus mycoides *and* Bacillus megatherium, *are capable of surviving a much longer period of exposure to moist heat in paperboard than* in vitro. *2. The resistance of these bacteria to heat* in vitro *is often too great for one to expect sterility within the practical time limits used on the drier rolls. 3. The resistance of these bacteria in paperboards is too great to obtain paperboard of a bacterial content less than 250 per gram if relatively large numbers of these bacteria are present in the wet web. 4. The heat resistance of a species of a bacteria isolated from paperboard may be much greater than that of a normal species.*

The paper leaving the drier rolls of a paper machine usually contains viable bacteria. At present little is known about the nature of these bacteria beyond the fact that the spore-forming type predominates. This type of bacteria produces both vegetative cells and spores, whereas the nonspore-forming bacteria produce only vegetative cells. The spore is the resting stage in which the species is enabled to survive many adverse conditions of environment. Although bacteria require heat for their development, temperatures above the optimum range are deleterious. It is known that all vegetative cells in a suspension of a spore-forming species of bacteria can be killed if the temperature is maintained at 80 deg. C. (176 deg. F.) for 10 minutes. Morrison and Rettger *(1)* used these conditions to obtain spore suspensions for studying heat resistance.

The pasteurization of milk and other dairy products is an excellent example of the lethal effect of heat upon nonspore-forming bacteria, some of which are pathogenic to man. According to the specifications of the United States Public Health Service *(2)*, pasteurization of milk consists in holding every particle of it at 61.8 deg. C. (143 deg. F.) for at least 30 minutes or at 71.1 deg. C. (160 deg. F.) for 15 seconds. It has been shown that either set of conditions is sufficient to devitalize all milk-borne pathogens. However, the species which survive pasteurization are mostly of the nonspore-forming type. From the standpoint of public health the undesirable species (human pathogens) are killed by pasteurization. A few strains of *Escherichia coli* have been found to survive pasteurization; however, these are unusual according to Tanner and Windsor *(3)*.

Gilcreas and Coleman *(4)* recently reported on the heat resistance of *Staphylococcus aureus* (a nonspore-former) in rebaked eclairs. The species used had been incriminated in cases of food poisoning. The results showed that 15 minutes of reheating at 216-220 deg. C. (421-428 deg. F.) were sufficient to kill all Staphylococci. Rebaking this type of pastry was strongly recommended.

The heat resistance of anaerobic spore-forming bacteria has been investigated because of their relationship to food spoilage and to food poisoning. The causal organism for botulism, *Clostridium botulinum*, has an extraordinary resistance to heat. According to Esty and Meyer *(5)* the spores were able to withstand temperatures of 105 deg. C. (221 deg. F.) for 100 minutes and 120 deg. C. (248 deg. F.) for 4 minutes. These results have been confirmed by Tanner and McCrea *(6)*. The former authors also reported that each of five other anaerobic spore-formers was killed after six minutes of heating at 105 deg. C. (221 deg. F.).

The heat resistance of aerobic spore-forming bacteria, such as those commonly found in the paper leaving the drier rolls, has not been studied as extensively; however, some data have been published along this line *(7)*.

During the present investigation the survival of bacteria on finished paper was studied in three quite different ways. One approach to the problem was to inoculate the wet web of a Fourdrinier machine with known bacteria and to determine the bacterial content of the finished inoculated paper. A second approach was to determine the bacterial content of peel-off liners in a paperboard mill. The third approach was to determine experimentally the time required to kill known bacteria at various temperatures *in vitro* and in paperboard.

Inoculation of the Wet Web with Known Bacteria

A useful procedure for studying the lethal effect of drier rolls involves the inoculation of the wet web with known bacteria. The paper leaving the drier rolls is then examined for these bacteria. Tanner,

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Wheaton, and Ball *(7)* used this procedure in studying two nonspore-forming bacteria, *Escherichia coli* and *Staphylococcus aureus,* and one aerobic spore-forming species. They were able to detect only the spore-forming species in the finished paper.

In the present investigation the wet web of an experimental Fourdrinier machine was inoculated with known species of bacteria. A mimeograph grade of paper was being made. The concentrated bacterial suspension containing a nontoxic dye (0.25% Pontasil green BL) was sprayed uniformly on the wet web as it passed over the suction box. Two sprayed areas were made with each suspension. One area was sampled as it left the presses and the other as it left the drier rolls.

The nonspore-forming bacteria used were *Escherichia coli* (a heat-resistant strain), *Staphylococcus aureus, Serratia marcescens,* and *Aerobacter aerogenes.* The spore-forming bacteria used were *Bacillus mycoides* and a variant of this species. The suspensions used for spraying the wet web were made from 24-hour cultures grown on standard nutrient agar.

The bacterial contents of the uninoculated wet web and of the resulting finished paper were determined to compare the heat resistance of the normal microflora of the system with that of the known species of bacteria which were used to inoculate the wet web. For comparative purposes the bacterial contents were calculated to a dry fiber basis (Table I).

The surviving bacteria in the finished paper, the wet web of which was inoculated with mixed suspensions of bacteria, were predominantly *Bacillus mycoides.* This was the only spore-former in the mixed suspension. The bacterial content of these papers was very high as compared with that of the uninoculated paper. Later when suspensions of *Escherichia coli, Aerobacter aerogenes,* and *Serratia marcescens* were applied separately, the bacterial contents of the inoculated papers were practically identical with that which had not been inoculated. These data show that the nonspore-forming bacteria, which were used to inoculate the wet web, were killed by passing through the drier rolls. They also show that great numbers of the spore-forming species survived the drier rolls.

The lethal effect of drier rolls is generally attributed to the action of moist heat upon the micro organisms. It is well known that this is dependent upon the temperature and the time of exposure. Table II summarizes the time and temperature data for the drier rolls on the Fourdrinier machine. The temperatures of the nineteen rolls were obtained by the use of a hand-model Cambridge pyrometer. There were a few drier rolls whose temperature was abnormally low; however, there was no way to correct this condition. The drying time of 80 seconds represented the total time required for a given section of paper to pass through the driers. These conditions of exposure to moist heat were sufficient to kill large concentrations of the nonspore-forming bacteria but they were insufficient to kill the spore-formers.

Bacterial Content of Peel-off Liners

The usual procedure for determining the bacterial content of a paper sample merely gives the number of viable bacteria which survived the papermaking process. It does not give any indication of the distribution of these bacteria within a given sample. In the case of cylinder machines peel-off liners are often

TABLE I.—BACTERIAL CONTENTS OF WET WEB AND FINISHED PAPER

Date	Species of Bacteria sprayed on the wet web	Wet Web* Bacteria per gram dry fiber	Finished paper** Bacteria per gram dry fiber
4/25/40	No spraying	200,000	485
4/25/40	Mixed suspension containing: a. *Escherichia coli* b. *Staphylococcus aureus* c. *Serratia marcescens* d. *Bacillus mycoides var*	8,730,000	2,210,000
4/25/40	Mixed suspension containing: a. *Escherichia coli* b. *Staphylococcus aureus* c. *Serratia marcescens* d. *Bacillus mycoides*	8,250,000	236,000
4/23/41	No spraying	19,400	1,400
4/23/41	*Escherichia coli*	430,000,000	1,350
4/24/41	No spraying	8,300	930
4/24/41	*Aerobacter aerogenes*	257,000,000	880
4/24/41	*Serratia marcescens*	238,000,000	1,970

* 31.5% dry fiber
** 97.0% dry fiber

TABLE II.—TEMPERATURE OF DRIER ROLLS AND TIME OF DRYING

Date of Inoculation of Wet Web	Temperature: Minimum deg. F.	Temperature: Maximum deg. F.	Temperature: Average for 19 rolls deg. F.	Time of Drying seconds
4/25/40	130	250	187	80
4/23/41	110	230	191	80
4/24/41	140	235	201	80

made to control the stock making up the liners. It was thought that this simple procedure might be adapted for the bacteriological examination of the liners.

A paperboard mill furnished the samples containing peel-off liners. The machine tender, after carefully washing and drying his hands, took two small squares of tissue paper, marked one corner of each with a dye solution and quickly inserted one square after the other between the liner cylinder and the wet web. He marked the edge of the web so that it could be identified at the dry end of the machine. The sample was taken in such a way that the tissue was also included. This method was used to obtain samples of top and bottom liners for each of four different types of paperboard made on the same machine.

Each sample was separated into two portions for bacteriological examination. The liner was removed aseptically from the portion of the sample containing the tissue and this constituted one sample. The portion from which the liner had been removed constituted the other sample. Since it was impossible to separate both liners from the same sample, a top liner from one sample was compared with a bottom liner from a different sample. These samples were taken in rapid sequence. It is evident that this procedure did not permit the determination of the bacterial content of the filler alone.

The bacterial content of samples from four different types of paperboard are given in Table III. In one of these boards, a sterile top liner was obtained and in no case was a sterile bottom liner obtained. The top and bottom liners of Boards 2 and 3

TABLE III.—BACTERIAL CONTENT OF PEEL-OFF LINERS

Sample	(Count per gram) Board 1	Board 2	Board 3	Board 4
Caliper, in.	0.016	0.028	0.028	0.032
Top liner	0	2,040	1,400	820
(Board + tissue) minus top liner	410	85,000	98,000	38,000
(Board + tissue) minus bottom liner	480	85,000	87,000	27,000
Bottom liner	380	11,400	2,520	420
Tissue	420	420	420	420
Board (complete sample)	850	79,000	78,000	25,000

contained many more bacteria than Boards 1 and 4. The bacterial content of the filler was low in only one board—namely, the one in which the filler was composed of unbleached sulphite and groundwood. The filler in each of the other types of paperboard was composed of mixed waste paper (Table IV). The high bacterial content of this type of filler would easily account for most of the bacteria in the finished paperboard. The case of Board 3 is exceptionally interesting because the stock furnished to all vats was mixed waste paper. The filler in the finished paperboard contained many more bacteria per gram than did either of the liners; however, the latter still contained large numbers of bacteria. The types of stock entering the furnish for each of the components of the boards are given in Table IV.

These data indicate clearly that the drier roll conditions on this cylinder machine were insufficient to kill all bacteria even in the liners, unless the stock itself had a low bacterial content. Various types of waste paper stock were used in the liners and fillers of Boards 2-4. Sterile liners did not result in any of these boards. These data also indicate clearly that the killing effect of the drier rolls was much less for the filler (which composed from 50 to 75% of the board) than it was for the liners.

Thermal Death-Time Studies

The heat resistance of five bacterial spore suspensions was determined *in vitro*. It was assumed that this procedure alone would not be sufficient for the present investigation, because the survival of spores in paperboard might be quite different from that *in vitro*, and the data confirmed this assumption. The results obtained by using inoculated paperboard were not nearly as regular as those obtained *in vitro*, but their significance in the present study is far greater.

The following bacterial spore suspensions were used *in vitro* and in paperboard:

1. *Bacillus mycoides* (normal culture)
2. *Bacillus mycoides* (isolated from paperboard)
3. *Bacillus megatherium* (normal culture)
4. *Bacillus megatherium* (isolated from paperboard)
5. *Bacillus species* (isolated from paperboard)

Each spore suspension was prepared following a procedure used by Morrison and Rettger *(1)*. An attempt was made to adjust the concentration of viable spores in each suspension to the same range of values. This was only partially successful, as the results will indicate. The stock suspensions of each

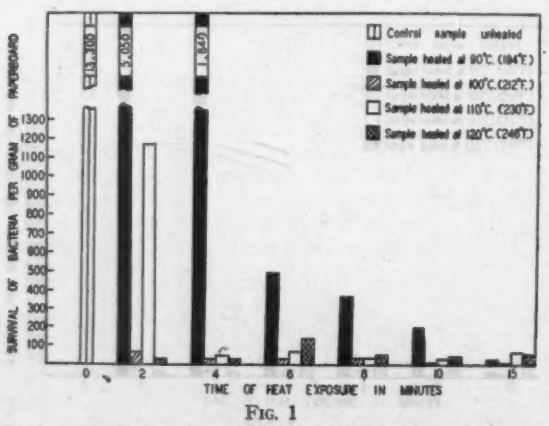
Control sample unheated
Sample heated at 90°C. (194°F.)
Sample heated at 100°C. (212°F.)
Sample heated at 110°C. (230°F.)
Sample heated at 120°C. (248°F.)
SURVIVAL OF BACTERIA PER GRAM OF PAPERBOARD
TIME OF HEAT EXPOSURE IN MINUTES

FIG. 1

Survival of *Bacillus Megatherium* (Normal Culture) per Gram of Paperboard

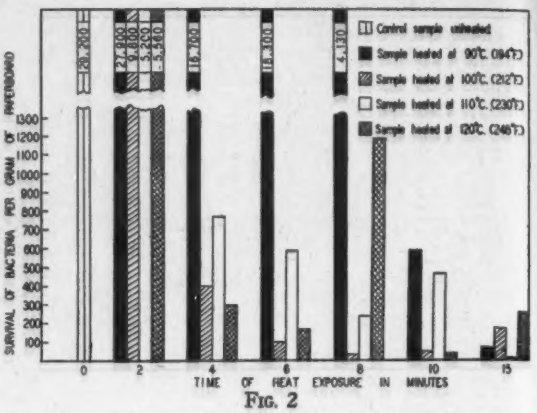
Control sample unheated
Sample heated at 90°C. (194°F.)
Sample heated at 100°C. (212°F.)
Sample heated at 110°C. (230°F.)
Sample heated at 120°C. (248°F.)
SURVIVAL OF BACTERIA PER GRAM OF PAPERBOARD
TIME OF HEAT EXPOSURE IN MINUTES

FIG. 2

Survival of *Bacillus Megatherium* (Paperboard) per Gram of Paperboard

TABLE IV.—TYPE OF STOCK USED IN BOARDS 1-4

Part of Board	Board 1	Board 2	Board 3	Board 4
Caliper, in.	0.016	0.028	0.028	0.032
Top liner....	Deinked stock and unprinted stock	Unbleached sulphite and white blank paper	Mixed waste paper	Jute
Underliner		Unbleached sulphite and manila clippings		
Filler	Unbleached sulphite and groundwood	Mixed waste paper	Mixed waste paper	Mixed waste paper
Bottom liner	Unbleached sulphite and groundwood	News	Mixed waste paper	News

culture were stored in a refrigerator when they were not being used.

It should be noted that "normal culture" indicated for each type of bacteria refers to a culture which is a part of the collection of bacteria at The Institute of Paper Chemistry. Furthermore, it should be noted that the "normal culture" represents one which was not isolated from paperboards. In contrast to these "normal cultures," the same species of bacteria have been isolated from paperboard and are of special interest because of their great heat resistance. The paperboards, from which these heat-resistant cultures were isolated, were made in mills which are attempting by all known means to produce a paperboard of low bacterial content. It should be noted also that none of these cultures are pathogenic bacteria.

Inoculation and Exposure

The thermal death-time studies with inoculated paperboard will be discussed in some detail at this point. A special technique had to be developed for inoculating and exposing paperboard to moist heat. Its final form consisted of the following for any one spore suspension of bacteria.

1. Preparation of 28 sterile paperboard samples (4 inches square and 0.032 inch caliper), each having a marked area (2.25 inches square) in the center and each marked area having been made into a sort of pocket by the use of a double-edged flat scalpel.
2. Inoculation of 26 sterile samples (1 cc. of the prepared spore suspension per board).
3. Exposure of 6 inoculated samples for different time intervals to temperature of 90, 100, 110, and 120 deg. C. (194, 212, 230, and 248 deg. F.).
4. Plating of each inoculated sample (including two unheated ones) and two sterile paperboard samples.

The bacterial content of the samples of board which had been exposed to moist heat can be taken as a measure of the heat resistance of the species of bacteria which were used to inoculate the boards. These bacterial contents have been recorded in Tables V to VII and in Figs. 1 to 3, inclusive, as survival

TABLE V.—SURVIVAL OF *BACILLUS MYCOIDES* WHEN EXPOSED IN PAPERBOARD TO MOIST HEAT

Exposure Time, min.	Temperature deg. C.	Normal Culture: Count per gram	Normal Culture: Survival %	Paperboard: Count per gram	Paperboard: Survival %
0	...	29,500	100.00	510,000	100.00
2	90	1,270*	4.31	348,000	68.24
	100	10	0.03	**	
	110	70	0.24	278,000	54.51
	120	30	0.10	220,000	43.14
4	90	190*	0.64	257,000	50.39
	100	30	0.10	177,000	34.71
	110	150	0.51	258,000	50.59
	120	30	0.10	265,000	51.96
6	90	10	0.03	168,000	32.94
	100	30	0.10	318,000	62.35
	110	60	0.20	258,000	50.59
	120	30	0.10	343,000	67.25
8	90	40	0.14	50,000	9.80
	100	20	0.07	4,350	0.85
	110	10	0.03	30,800	6.04
	120	600	2.03	92,800	18.20
10	90	270	0.92	12,500	2.45
	100	40	0.14	38,800	7.61
	110	60	0.20	38,800	7.61
	120	60	0.20	108,800	21.33
15	90	30	0.10	160	0.03
	100	60	0.20	590	0.12
	110	50	0.17	9,400	1.84
	120	180	0.61	13,200	2.59

* Typical colonies of *B. mycoides* predominated on these but not on others.
** Sample lost.

values for the time exposures indicated. Some unexpected and striking irregularities appear in these data. These can be explained easily, however, when the inoculating procedure is recalled. It was impossible to inoculate a set of 26 samples uniformly, although exactly 1 cc. of spore suspension was added to each board sample. The spore suspension could have distributed itself inside the board sample in various ways, depending upon the area actually

TABLE VI.—SURVIVAL OF *BACILLUS MEGATHERIUM* WHEN EXPOSED IN PAPERBOARD TO MOIST HEAT

Exposure Time, min.	Temperature deg. C.	Normal Culture: Count per gram	Normal Culture: Survival %	Paperboard: Count per gram	Paperboard: Survival %
0	...	13,300	100.00	29,200	100.00
2	90	5,050	37.97	27,900	95.55
	100	60	0.45	9,800	33.56
	110	1,130	8.50	5,200	17.81
	120	20	0.15	5,560	19.04
4	90	1,840	13.83	16,700	57.19
	100	30	0.23	400	1.37
	110	40	0.30	740	2.53
	120	20	0.15	290	0.99
6	90	480	3.61	18,300	62.67
	100	30	0.23	100	0.34
	110	60	0.45	570	1.95
	120	140	1.05	160	0.55
8	90	370	2.78	4,130	14.14
	100	20	0.15	20	0.07
	110	20	0.15	220	0.75
	120	50	0.38	1,190	4.08
10	90	190	1.43	570	1.95
	100	10	0.08	50	0.17
	110	40	0.30	460	1.58
	120	30	0.23	30	0.10
15	90	20	0.15	60	0.21
	100	0	0.00	150	0.51
	110	70	0.53	0	0.00
	120	50	0.38	240	0.82

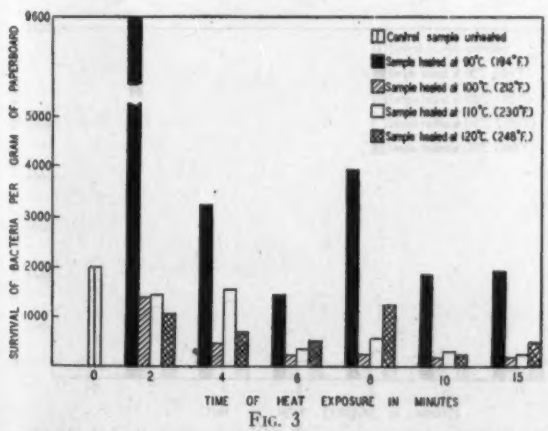

FIG. 3
Survival of *Bacillus Species* (Paperboard) per Gram of Paperboard

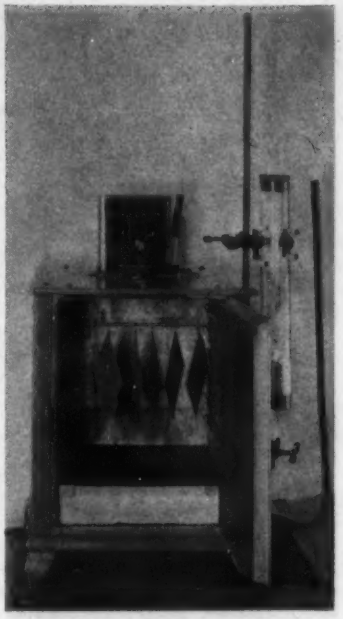

FIG. 4
Oven with Steam Connection and Opened to Show Inoculated Paperboard Samples

wetted. The unheated and inoculated controls were made in duplicate and their bacterial content was in much greater disagreement than was desirable. The average values are recorded in the tables and figures. Owing to the large number of samples required, it was not possible to duplicate the heated board samples.

It is important to keep in mind that the four steam-saturated ovens were regulated as closely as their construction permitted. The temperatures of 90, 100, 110, and 120 deg. C. (194, 212, 230, and 248 deg. F.) were adjusted and maintained as evenly as possible. The maximum variation from the temperature desired was 4 deg. C. (7 deg. F.), whereas the usual variation was 2 deg. C. (4 deg. F.) or less. The temperature was recorded just prior to the removal of each board sample from the oven. The relative humidity was more variable than the temperature; however, it was quite constant during each separate

TABLE VII.—SURVIVAL OF *BACILLUS SPECIES* WHEN EXPOSED IN PAPERBOARD TO MOIST HEAT

Exposure Time, min.	Temperature, deg. C.	Paperboard: Count per gram	Paperboard: Survival %
0	...	2000	100.00
2	90	9600	480.00*
	100	1370	68.50
	110	1420	71.00
	120	1060	53.00
4	90	3300	165.00*
	100	400	22.00
	110	1600	80.00
	120	650	32.50
6	90	1430	71.50
	100	230	11.50
	110	310	15.50
	120	500	25.00
8	90	4000	200.00*
	100	260	13.00
	110	600	30.00
	120	1190	59.50
10	90	1880	94.00
	100	180	9.00
	110	400	20.00
	120	270	13.50
15	90	1950	97.50
	100	170	8.50
	110	290	14.50
	120	490	24.50

* Values indicate actual growth at 90 deg. C.

run of six samples. The relative humidity of the 90 and 100 deg. C. (194 and 212 deg. F.) ovens was frequently 100% and never less than 96%. In the case of the other two ovens, the relative humidity was lower, and ranged from 85 to 91%. The values of relative humidity were calculated from the pressures at the dew point and oven temperatures. It is believed that these conditions of temperature and relative humidity approximate very closely those encountered on the drier rolls of paper machines.

Each of the four ovens, used for exposing inoculated paperboard samples to moist heat, was set up and adjusted for the desired temperature while live steam was being passed through it by means of the steam trap shown at the right of the oven in Fig. 4. When the desired temperature had been obtained for a given oven, the dew-point apparatus was connected at the thermometer well and the dew point was determined for that particular oven. After the determination of the dew-point temperature, six inoculated paperboard samples were suspended from a rod as rapidly as possible into the position shown in Fig. 4. This operation required from 30 to 40 seconds. At the end of two minutes from the time the first paperboard sample was introduced, it was removed and placed into the envelope from which it had been taken. After four minutes the second sample was removed. This continued for time intervals of 6, 8, 10, and 15 minutes. Each set of six heated and inoculated squares was kept in a refrigerator until it was plated out a few hours later.

Thermal Death-Time

The heat resistance of each bacterial spore suspension also was determined by the more precise method known as thermal death-time determinations *in vitro*. This method is frequently used by bacteriologists as a means of determining the resistance of bacteria to heat. Briefly, the method consists of the following steps for each temperature used:

1. Preparation of a series of 5 to 8 thermal death-time tubes, each containing approximately 2 cc. of the spore suspension, which are sealed with a flame.
2. Exposure of the tubes in a thermostatically regulated oil bath for different time intervals.
3. Plating each spore suspension for an estimate of the number of spores which survived the temperature of the oil bath. The unheated suspension is also plated.

The data obtained for each of the five temperatures of exposure are summarized in Table VIII. It will be noted that a marked difference in heat resistance occurs with *Bacillus mycoides* and *Bacillus megatherium*, depending upon the previous history of the cultures. Those isolated from paperboard were more resistant than normal cultures. *Bacillus species* (isolated from paperboard) was unusually resistant to heat. It survived 30 minutes of heating at 100 deg. C. (212 deg. F.) and it required 8 minutes at 110 deg. C. (230 deg. F.) to kill all spores in the suspension used.

TABLE VIII.—THERMAL DEATH-TIMES *IN VITRO*

Temperature of Oil Bath deg. C.	Time in Minutes Required to Kill All Bacteria at Temperature Shown				
	Bacillus mycoides		*Bacillus megatherium*		*Bacillus species*
	(Normal)	(Paperboard)	(Normal)	(Paperboard)	(Paperboard)
78 ± 1.0 (172 ± 1.8 °F.)	(30)*	(30)*	(30)*	(30)*	(30)*
90 ± 0.3 (194 ± 0.5 °F.)	30	(25)*	30	(30)*	(30)*
100 ± 0.3 (212 ± 0.5 °F.)	4	20	6	6	(30)*
110 ± 0.5 (230 ± 0.9 °F.)	2	3	2	2	8
120 ± 0.5 (248 ± 0.9 °F.)	2	2	2	2	2

* Bacterial spores survived the time interval indicated—e.g., at 78 ± 1.0 deg. C. all of the suspensions showed survival after 30 minutes of exposure.

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Pacific TAPPI Meets at Portland

Pacific Section of the Technical Association of the Pulp and Paper Industry held an evening meeting at the Old Heathman Hotel in Portland, Oregon, March 10th. Due to the fact that the Camas Paper School was holding graduation exercises, the attendance was smaller than usual, 64 being present to enjoy an interesting program.

The following papers were presented: "Spectrochemistry—A New Tool for Industry" presented by James M. Orr, of the Charlton Laboratories, Portland, Ore. "Mechanical Insurance" a paper to be presented by Mr. Lee C. Baltzelle, Supervising Engineer, Pacific Indemnity Company, Seattle, Washington. A movie entitled "Naval Stores Production and Use".

Those present included the following:

O. C. Abbott, Gerald Alcorn, Lee C. Baltzelle, E. R. Barrett, Carl E. Braun, Harold Burkitt, Agnes S. Burt, David B. Charlton, R. E. Chase, Jr., J. V. B. Cox, J. D. Darby, Harold A. Deery, Alec C. Duncan, John DuPuis, K. Earnest, A. E. Erickson, Clarence Esser, J. P. Foley, Leo Friedman, William R. Gibson, Harry W. Glenn, C. H. Graham, T. H. Grant, Ben Harris, Jan Haugerod, Andrew D. Hawley, Svarre E. Hazelquist, J. J. Hollender, Otto L. Hudrlik, J. B. Hyde, Henry Jacobsen, W. C. Jacoby, Errol Hay Karr, W. H. Kasch, Robert B. Kirkwood, John E. LeTourneaux, C. J. McAllister, D. K. MacBain, C. R. McCully, Robert W. Martig, T. H. Moran, C. W. Morden, G. A. Nelson, Geo. Nelson, Austin Nickels, E. T. Parker, Jr., H. T. Peterson, J. C. Plankinton, Ralph K. Pratt, Clifford S. Reppe, E. J. Roake, Walter A. Salmonson, Harlan Scott, F. C. Shaneman, C. Sholdebrand, V. L. Tipka, R. M. True, R. O. Vognild, L. H. Wear, Ed Webberley, Fred J. Weleber, James A. Wilson, Edward P. Wood and Herbert Wymore.

Lake State to Meet May 22

The annual May meeting of the Lake States Section of the Technical Association of the Pulp and Paper Industry will take place at the Hotel Beaumont in Green Bay, Wis., Friday, May 22, 1942. Golf will be played at the Oneida Golf Course during the day and many prizes will be awarded. The dinner will be held at the Hotel Beaumont at 7 o'clock in the evening.

Frederick S. Jones Goes to New York

Frederick S. Jones, chief engineer of the New England division of the Socony-Vacuum Oil Company in Boston, has been transferred to the technical staff of the headquarters office of the company at 26 Broadway, New York.

Developments in the Graphic Arts, 1941*

By M. S. Kantrowitz[1]

This development report presents an outline of the major technical trends in the *graphic arts* during the year 1941.

Graphic Arts is a comprehensive term now commonly accepted as pertaining not only to the fine arts but also to processes of printing, engraving, lithography, and bookbinding. The Graphic Arts Committee of the TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY therefore has in its sphere a wide field for exploration.

Paper

METHODS FOR TESTING PRINTING QUALITY

The Graphic Arts Committee of TAPPI devoted considerable time during the year to develop laboratory methods for paper testing for more definitely correlating the physical characteristics of paper with its printing qualities so that the performance of a specific paper upon any particular job of printing might be reasonably predicted by the tests made before the paper reached the press.

A method for evaluating the surface roughness of paper is described by Heinig and Baird*(1)*. The irregularities of essentially stress-free paper surfaces may be measured directly, expressed numerically, and the roughness statistically evaluated.

HYGROMETRIC CONDITION OF PAPER

In a paper presented under the jurisdiction of the Graphic Arts Committee at the Annual Meeting of TAPPI in February, 1941, Weber*(2)* described a new method of obtaining the correct adjustment of the hygrometric condition of the paper. In this newly developed method, adjustment of the moisture content is quickly and conveniently accomplished with the conventional type of paper-conditioning machine by adding water, in measured amounts, to the air within the machine. The method employs humidifier spray nozzles which are fed from a reservoir into which the water is measured. The method makes it possible to bring paper to a selected moisture content not below equilibrium with the room air, and greatly increases the rate of conditioning.

GLOSSMETER

A glossmeter or device for measuring gloss on paper developed by Bradner and Munso is described in U. S. patent 2,246,501 (July 24, 1941).

Ink

HYDRY INKS

The presentation of a paper on "Hydry Inks and Process" by Erickson and Elliott*(3)* in the Graphic Arts Session at the Annual Meeting of TAPPI on February 17, 1941 was the first public announcement of this new ink. It marked the culmination of several years of experimental development and intensive field tests made by printers. Hydry inks are now in actual commercial use by reputable printing plants engaged in various classes of work. These quick-drying inks employ the usual pigments, but the vehicle is a special synthetic resin and an odorless organic solvent having a very high boiling point and a very low vapor pressure. Hydry inks are distributed in the usual manner during the printing process, but after a sheet is printed, the image is subjected to the application of steam. This increases the water content of the surface of the ink and a thin, hard film is instantly formed over the printed portion. Hydry inks are odorless and this in addition to their nonoffset properties makes them suitable for printing bread wrappers, milk cartons, and other food packages.

VAPOSET INKS

Newly developed *vaposet* inks*(4)* set instantly by precipitation when sprayed with plain tap water or water vapor such as steam. The vaposet inks are suited for printing containers, cartons, bread wrappers, drinking cups, paper bags, and labels. The inks may be used on flatbed and webfed presses. Many advantages are claimed for these waterset inks including the elimination of elaborate heat-drying units, faster press speeds, cleaner impressions, and elimination of setoff and smudging.

WINK-DRI INKS

Wink-Dri inks have recently been introduced to the printing trade. These inks harden almost immediately on coated stock without the application of heat. On uncoated stock the drying time is one half to one hour.

WATER-BASE CARBON INKS

Water-base carbon inks developed by Auborn Taylor*(5)*, pressroom superintendent of the Charleston, West Virginia Gazette are said to eliminate strike-through and first impression setoff. While developmental work has not yet reached the stage to include the printing of an entire newspaper edition with this new ink, pressroom executives are enthusiastically acclaiming the unqualified success of the water-base carbon inks.

PLASTIC-BASE INK

The development of a quick-drying smudge-proof plastic-base ink utilizing aruba bitumen was recently announced*(6)*. This new ink, it is said, hardens immediately upon application to paper at room temperature and will not rub off. The base of the ink is aruba bituminous resin, a synthetic plastic.

INKS FROM SULPONATED OILS

The preparation of intaglio inks from water-soluble oils such as sulphonated caster oil, sulphonated neat's-foot oil, sulphonated olein together with water as the principal solvent, the usual pigments and fillers, and manila copal as the resin constituent, is covered by U. S. patent 2,170,198.

These inks are said to be waterproof, more or less glossy, and capable of adjustment in consistency by addition of more or less copal.

METAL DECORATING INK

A new metal decorating ink, known as "tin printing production ink", has recently been announced. Special features claimed for this ink include hard baking

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* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y. Feb. 16-19, 1942.

[1] Member TAPPI; Chairman, TAPPI Graphic Arts Committee; Technical Director, Government Printing Office, Washington, D. C.

at the average temperature and average time used in either fast, automatic, or slow ovens, the ink being of sufficient flexibility to adjust itself to either condition without the necessity of manipulation by the pressman. It is said that the ink will not scum or grease, will resist water and will give no trouble on the press in high speed production.

Ink Drying

Equipment for printing presses making use of infrared rays for drying of inks has recently been made available to the printing trade*(7)*. It is claimed that the new heating equipment will dry heatset inks almost instantly, that it will dry offset and letterpress inks in approximately one quarter the usual time, and that it will eliminate setoff without the use of sprays.

Tobias*(8)* made comparative drying tests with tall oil esters containing 12, 20, and 33% rosin, and an Argentine linseed oil. Tall oil glycerol esters with a high rosin content gave very satisfactory results. The tall oil glycol esters were found to be unsuitable as a vehicle for printing inks.

Kuhn*(9)* conducted additional tests with inks made with glyceryl tall oil esters concerning their drying qualities on a number of papers and on metal foil. He found that only the hard-finished writing paper and the metal foil required longer drying time for the tall oil inks.

Antisetoff Sprays

Glyceryl monostearate, a synthetic waxlike material is receiving considerable attention as an effective antisetoff spray*(10)*. When melted and sprayed on freshly printed sheets, it covers the entire surface with minute particles of waxlike substance which prevents offset.

Another recent spray development*(11)* utilizes dry starch powders. The new device, called *oxy-dry sprayer,* functions to prevent setoff by applying edible starches in dry form without suspension in liquid directly upon the freshly printed sheets in the press delivery. The starch particles hold the sheets apart, thus preventing contact between the freshly printed image and the back of the next sheet.

Inking System

A new ink distributing system known as *anilox(12)* for envelope printing is said to make possible faster production with sharper, cleaner printed results. The anilox inking attachment is designed for rotary envelope machines and Harris P2 envelope presses. It consists of a knurled roller in an ink fountain which can be adjusted to ink the rubber plates on the rotary plate cylinder. This eliminates the customary fountain and inking rollers. It is being used in several large envelope printing plants.

The anilox system employs a rubber doctor blade to insure even distribution of the ink in the knurled crevices of the inking roller. In addition to envelope printing, anilox printing is used in printing candy wrappers, bread wrappers, napkins, kraft, tissues, cellophane, glassine, pliofilm, aluminum, and tin foil.

Ink Coverage

The research Committee of the Folding Paper Box Association*(13)* has studied the relationship of ink coverage at low gravities on clay-coated, patent-coated, and bleached manila boards.

Methods for Testing Ink Requirements

An *inkometer* was recently developed at the laboratories of the Lithographic Technical Foundation under the direction of Dr. Robert F. Reed for the purpose of measuring the consistency of printing and lithographic inks. The development of the inkometer was undertaken to solve the problem of providing a scientific mechanical test for ink consistency to replace the old-time finger test.

United States patent 2,243,674 assigned to Fred W. Hoch describes a novel device for the rapid measurement of the color tones of ink. The device consists of a hollow container for the ink to be tested. A series of cutouts or slots of varying depths are arranged around the perimeter of the container, the size of each opening being definitely gauged as a measuring means for allowing a desired quantity of ink to pass from the inside to the outside of the container by sliding the testing device across a testing surface. Known thicknesses of ink can be applied and the color value, coverage, etc., can be readily calculated.

Green*(14)* describes a new instrument which he calls the *tackmeter* for analyzing and measuring tack and its application to printing inks. He defines tack as the pull resistance exerted by an ink film adhering between two surfaces that are separating at a definite rate and with a known area of contact and known initial film thickness.

United States patent 2,247,297 (June 24, 1941) describes a mulling device for testing or matching samples of pigments for color or shades of color.

Adam Hilger*(15)* describes the Hilger photometric color comparator and the Hilger photometric amplifier for measuring spectral characteristics of colors. The instruments are recommended for the precision control of the composition of inks, for matching colors, and for investigating the effects of fading.

A new type of glossmeter designed to test samples for compliance with specifications and to measure progressive changes in the gloss of various finishes and inks has been developed by the Henry A. Gardner Laboratory*(16)*

Printing Press Rollers

Synthetic Rubber Rollers

A new synthetic rubber, "Ameripol", appears to possess possibilities in the manufacture of oil-resisting printing rollers*(17)*. It is claimed that it is resistant to mineral, animal, vegetable oils, and fats and to the oxidizing effect of the metallic driers in printing inks.

Ideal Synthox Rollers

The development of a new press roller called "Ideal Synthox Roller"*(18)* has recently been announced for use as forms and distributing rollers on all presses from small high-speed jobbers to large rotary presses. These rollers are suitable for use with aniline, linseed, and heatset inks.

Vandercook Roller Tester

A new Vandercook*(19)* roller tester has been designed to test the effect of inks on rollers and the wearing qualities of rollers.

Plastics Play Vital Role in the Graphic Arts

In a recent article, Levey*(20)* discussed plastics and the vital role they play in the graphic arts. He

stated that their utilization in the printing industry is so extensive that it touches every phase. He enumerated their use as a base or vehicle in printing inks, as ideal material from which to make printing mats, as a material suitable for book covers and plastic bindings which have superseded the metallic wire bindings. A plastic type has been developed although such type has not come into general use. New plastic plates known as lithomat and photomat have been announced.

Levey stated, "In the printing industry a plastic can hardly be classed as a substitute product but rather as a new material of construction with distinctive inherent properties, making it far better suited to these applications than the materials which it replaces."

Printing Processes

Drake*(21)* reviewed some of the important developments in the printing industry affecting letterpress, offset, and gravure printing. Heatset inks, coldset inks, and a cheap method of spraying to prevent setoff are foremost among the advances in letterpress printing. The introduction of the four-color process and the use of gloss inks resulted in changes in the other printing processes.

Monochrome Tone Reproduction

Poulter and Croney*(22)* describe the development of a technique for evaluating monochrome tone reproduction and its application to letterpress halftone printing on newsprint. The technique evaluates the quality of tone reproduction with respect to the block used. Tone reproduction is expressed in terms of percentage brightness of the unprinted paper. They found that tone reproduction is remarkably constant for prints made under identical conditions. The difference in tone reproduction of prints taken at various pressures is small where the weight of ink transferred at each pressure is constant.

New Kodak Fluorescence Process

The new Kodak fluorescence process*(23)* was recently introduced to obtain improved color rendition, with correction at the source rather than near the completion of color work in much less time than is required with other processes. The fluorescent water colors constitute eighteen colors which can be reproduced with form-color printing inks. In making separation negatives, the fluorescence is utilized to provide added density where necessary.

Kodagraph Contact Screen Process

A major contribution in halftone reproduction resulted in the development of the Kodagraph contact screen process*(24)*. This new method involves the use of a special continuous-tone negative printed in contact with the Kodagraph contact screen to obtain a screen positive. The negative image and the screen pattern are composed of dyes which in conjunction with the use of filters before the printing light, provide the closest control of contrast in the screen positive without affecting dot formation.

Where the photomechanical process requires the use of a halftone negative, it can be printed by contact or the halftone positive may be reversed to a negative in processing.

It is claimed that this new process provides improved sharpness of detail, more faithful tone reproduction, and close control of contrast, in full-color work as well as in black and white.

Photoelectric Register for Multicolor Presses

A photoelectric device for controlling register on a multicolor webfed press is described by W. D. Cockrell*(25)*. Inconspicuous register marks about 0.02 inch wide and 0.5 inch long are etched on the first color cylinder. Photoelectric cells are used to scan these register marks and a mechanism is provided to automatically adjust the press if there is any misregister on the other three colors.

J. S. Mertle*(26)* discussed recent developments and trends in the photolithographic field, including phototypesetting, diaphragm controls, the fluorographic process, methods of dot etching, and wetting agents in developing.

Photolithographic Printing Plates

An important advancement is the use of grainless plates in which two metals are employed. One such plate called "Alkuprint" covered by British patent 475,588 has a 0.003 mm. coating of copper alloy over an aluminum sheet. The metal is etched down to the aluminum in the nonprinting areas leaving a durable copper image. A similar process the "Aller" process covered by British patent 483,349 employs a thin copper image on a lead plate. In another process zinc and a small quantity of aluminum are electrolytically deposited on steel so that the pores of the base metal are opened and the zinc and aluminum are impregnated in the steel giving it a porosity similar to lithographic stone.

Wetting Agents

Wetting agents belong to a group of materials called surface active agents, the characteristics of which are their ability to lower surface tension. One such chemical compound called Aerosol*(27)* has recently been placed on the market and has been found to be an effective cleaning agent for negatives and plates in photography. It aids in the elimination of pinholes and streaks in negatives, produces more brilliant negatives and reduces drying time for film.

New Gold Size in Bookbinding

A new gold leaf and book varnish known as *varsize(28)* has been developed for blankbook and lawbook work as well as for gold tooling and gold stamping on geinuine and imitation leather, bookcloth and buckram. It takes the place of egg albumen and eliminates vinegar and paste washing. It can be used for a gold size and for a varnish.

Index to Printing Literature

The first 32-page section of an index to graphic arts periodical literature*(29)* appeared as a supplement to the April issue of the Share Your Knowledge Review. The second, third, and fourth installments of this index appeared as supplements of the June, August, and November, 1941 issues of Share Your Knowledge Review, respectively.

This index is being prepared by R. Randolph Karch as Chairman of the Research Commission of the International Association of Printing House Craftsmen and is being printed in the form of separately bound supplements to the Share Your Knowledge Review. Each article is referred to by an abbreviated code which indicates the publication, month,

year, and page number. It thus enables one to locate readily any article related to the graphic arts printed in recent years.

Research Organizations

Authority to establish a research department to conduct research in photoengraving was voted by the 45th annual photoengravers' convention held in Chicago, October 20-22, 1941. Organization and maintenance of the research department will depend on contributions from members and others interested in the project.

American Type Founders Inc. acquired the International Photographic Research Laboratories for the purpose of conducting research and development work in multicolor reproduction for letterpress, offset, and gravure.

Printing Plates Research, Inc. has launched a three-year program of research which is being conducted in the laboratories of Batelle Memorial Institute and directed toward the development of new and improved products and more efficient methods for use in the printing-plates trades and industries. A new five-year agreement for paper research was made between the Dominion Government, McGill University, and the Canadian Pulp and Paper Association relating to the Pulp and Paper Research Institute of Canada. Under the new agreement, the work in the Institute is now coordinated into one comprehensive plan of research and development for the benefit of the industry.

Substitution Products

In this time of national emergency it is of paramount importance that the utmost resourcefulness be directed toward conservation of materials and the industry must look to research to solve its problems concerning shortages. The effects of such shortages will obviously lead to the development of new methods and new materials.

Ozokerite wax, used as the principal ingredient in molding electrotype cases is mined chiefly in Galicia. This source is being cut off by the war. Several wax substitutes such as Ozowax, Ozotex, Isco molding wax, and standard electrowax have been offered from sources of supply within the United States. They are semisolid hydrocarbon residues from crude oil distillations. Their physical properties are similar to many natural waxes.

Flake graphite imported from the island of Madagascar and used in the electrotyping process may soon be substituted by graphite from domestic sources if experiments at the U. S. Bureau of Mines are successful.

Nickel is a priority metal and is greatly in demand for war materials. Experiments are being conducted in the electrodeposition of iron as a substitute for nickel for face plating stereotypes and copper electrotypes.

Albumen required for light sensitizing offset plates and used in bookbinding formerly obtained principally from China is now being produced in this country. A bichromated solution of dextrin has been suggested as a substitute. Polyvinyl alcohols, sensitized with ammonium bichromate can be used. Other synthetic substitutes for albumen have been placed on the market.

Substitutes for gum arabic in desensitizing litho plates and stones have been worked out by Printing and Allied Trades Research Association*(30)*. The most successful of these is the sodium salt of a cellulosic acid. The substitution of a solution of arabogalactan for gum arabic is described in U. S. patent 2,250,516.

In photography the sodium salts can in many cases be substituted for their corresponding potassium salts. For example, sodium metabisulphite may be employed to replace potassium metabisulphite and sodium hydroxide may replace potassium hydroxide in developers. Anhydrous ethyl alcohol used in removing the developing and etching fluids from deep etch plates may be substituted by tertiary butyl alcohol prepared from petroleum gases and is available in unlimited quantity.

Sorbitol, a hexahydric alcohol, may be substituted for glycerine in part in the manufacture of composition press rollers and entirely in the production of bindery flexible glues. Ducerin has also been suggested as a substitute for glycerine.

Linen thread used in handsewing of books is made from flax fiber imported from France, Ireland, Belgium, Holland, and Russia. Cotton thread of suitable size and strength may be substituted for linen thread.

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Imports of Paper and Paper Making Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

Importers may have their shipments listed in these columns by submitting records of imports to this publication.

NEW YORK IMPORTS

WEEK ENDING MARCH 21, 1942

SUMMARY

Newsprint .....5,762 rolls.

NEWSPRINT

——, ——, ——, 5,762 rolls.

RAGS, BAGGINGS, ETC.

West Texas Cottonoil Co., ——, ——, 487 bls. cotton linters.

CASEIN

National City Bank, ——, ——, 500 bags.
H. S. Cramer & Co., ——, ——, 1,667 bags (ground Lactic).

Paper and Cordage Men Meet

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., March 23, 1942—The Philadelphia Paper and Cordage Association held its March meeting at Kugler's Chestnut Street Restaurant on Friday last, with president Harry Smith of the Thos. W. Price Company, presiding. After a discussion of special association affairs, a new set of By-Laws was adopted. The new By-Laws embodies no radical changes in the rules of the organization but do clarify the working principles and provide for changes in the election laws, particularly the stipulation that directors shall not succeed themselves for a period of two years; two directors will be elected each year to serve for a period of three years. It is hoped by this new feature of the By-Laws that new men will gradually work into the management of the association.

The Entertainment Committee comprising George K. Hooper and E. K. Lay, both past presidents of the association, announced that the annual shad dinner will be held on Friday evening, April 24, at a place to be announced later.

To Give Paper Lectures at M. I. T.

At The Massachusetts Institute of Technology, lectures on hand-made paper have been given in the course on The Arts of the Book by Dard Hunter. On May 5, 7 and 12 lectures on machine-made paper will be delivered by William Bond Wheelwright. The Dard Hunter Museum of Paper provides a great variety of material and exhibits used in these lectures and this is supplemented by motion pictures and slides owned by the Institute.

The purpose of this course is to provide a general understanding and appreciation of book manufacture, and what constitutes a well made book. It does not attempt to teach either the technique of printing or of papermaking. The course which is now being given for the third consecutive year is an elective course open to any who are interested in knowing about the history of printing, methods of book manufacture and about paper in its relationship to books.

Federal Trade Commission Reports

The Federal Trade Commission has submitted to Congress its 27th annual report covering activities during the fiscal year 1940-41.

The Commission renewed its recommendation previously made, that Congress amend the corporate stock acquisition provision (Section 7) of the Clayton Act so that the acquisition of corporate assets should be declared unlawful under the same conditions that acquisition of corporate stock has been unlawful ever since 1914.

National defense activities of the Commission include investigations of house furniture prices at the request of the Office of Price Administration; investigation of bread and bakery product prices; investigation of priorities orders in the steel industry as requested by the Office of Production Management; and collection and auditing of quarterly and annual reports for a large number of corporations at the request of the Office of Price Administration and other agencies.

The Chairman of the Commission serves in connection with governmental committees having to do with national defense activities and members of the Commission's staff have assisted other agencies and Congressional committees in defense work. The Chairman is the Commission's representative in connection with the Economic Defense Board established by the President for developing plans and policies to protect the country's international economic relations, and is a member of the Petroleum Coordinator's committee for development and utilization of petroleum resources and facilities; of the price administration committee of the Office of Price Administration; and of the Bureau of Industrial Conservation of the Office of Production Management which is carrying on an intensive "War Against Waste."

Current general investigations of the Commission taken up in its report are: (1) Corporation reports, a compilation of financial statistics of 76 industry groups comprising the combined operations of 780 corporations having total sales aggregating $24,932,624,668; (2) distribution cost accounting, concerning which the Commission published Case Studies in Distribution Cost Accounting for Manufacturing and Wholesaling (House Document No. 287, 71st Congress, first session); (3) distribution methods and costs; (4) resale price maintenance; (5) furniture prices, costs and profits, mentioned above in connection with national defense activities, and (6) mass food distributors.

New York Paper and Pulp Market Review

OPA Amendment On Mixed Waste Paper Baling Weight and Elimination of "Upgrading" Removes $2 Per Ton Differential — Paper and Pulp Markets Strong — Trading In Others Active.

Office of the PAPER TRADE JOURNAL
Wednesday, March 25, 1942.

Demand for some kinds of paper and paper board continues very heavy, with reports indicating a steadier tone in the market. Reports received this week from many manufacturers' representatives, jobbers, and general paper merchants, also reflect less concern as to the future supply of paper. The opinion expressed in some quarters of the trade is that, while the demand for many major paper lines is unprecedently heavy, rather too much comment and emphasis of a paper shortage has occurred. It appears to be a widely held opinion that over-estimates of potential requirements, based too much on theory and not enough on factual data, is in great part responsible for the confused supply situation.

The index of general business activity for the week ended March 7 rose to 133.7%, from 132.8% for the preceding week, compared with 121.4% for the corresponding week last year. Paper board output was fractionally higher.

Paper production for the week ended March 7 was estimated at 101.4%, compared with 91.8% for 1941, with 84.5% for 1940, with 82.3% for 1939, and with 69.3% for the corresponding week for 1938.

Paper board production for the week ended March 7 was 100.0%, compared with 82.0% for 1941, with 70.0% for 1940, with 70.0% for 1939, and with 69.3% for the corresponding week for 1938.

Consumer demand for some kinds of paper is reported as continuing to reflect a downward trend. The extremely heavy actual and estimated requirements of the government for all purposes, which has been so extensively publicized, is viewed in some quarters of the trade as one possible cause; priorities, restrictions and curtailment of the use of specified grades of paper for certain commercial uses, is held to be exerting a like influence in reducing demand.

Heavy demand for kraft paper and container board continues to be reported at this date.

The price situation remains unchanged, with some irregularities reported. In general, the average, representative quoted market prices remain unchanged. With the OPA active in its endeavors to keep prices at approximately the current level, no substantial rise in paper prices is expected in the trade.

Chemical Pulp

Demand for all prime grades of chemical wood pulp continues to be reported as heavy. The Division of Industry Operations, J. S. Knowlson, director, War Production Board, announced on March 21 that, General Preference Order M-52, providing for the allocation of sulphite pulp, has been extended to May 1, 1942. It was scheduled to expire on March 31.

Rags

Demand for cotton rags is reported good this week. Mill buying of the roofing grades is quite heavy at this date. OPA prices are firmly maintained.

The monthly reporting OPA order, Price Schedule No. 47, Old Rags, requires individuals and concerns in the trade, buying, selling, or consuming 10 short tons or more in any one month since December 1941, to file a report with the Office of Price Administration. Thereafter, a monthly report must be filed, even should the tonnage of rags handled decline below the 10 ton requirement in any future month.

Old Rope and Bagging

Demand for old rope is steady at the OPA ceiling price on No. 1 domestic Manila. Other grades of rope and strings are quite active. Prices are firm and unchanged.

Trading in scrap bagging is active. Prices on gunny are firm and unchanged. Trading at top OPA prices is widely reporting on No. 3 bagging.

Old Waste Paper

The OPA in its Amendment No. 2 to Revised Price Schedule No. 30, Waste Paper, removed the $2 per ton differential on No. 1 mixed paper and on old corrugated boxes included in this grade packing. The amendment defines maximum prices for waste paper and explains the provision on baling and that inserted to eliminate "upgrading," which compels persons dealing in waste paper to keep intelligible records.

Twine

Demand for major grades of twine is reported active at this date. Prices are firm. No important change from prevailing, average, representative quoted market prices has been reported this week.

Kraft and Building Papers Active

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., March 23, 1942—Paper distributors in this area are in a good position to fill orders for coated papers and certain grades of printing papers, which seem to be more plentiful than other items. While there is no glut in the market, the fact remains that printers are not getting the orders they anticipated from advertising agencies and mail order houses because of the cancellation on the part of advertisers to execute the advertising campaigns that were scheduled some months ago, and which because of priorities have had to be more or less curtailed.

The kraft situation is not showing any improvement because of the curtailment in Washington of the consumption of kraft, a condition brought about in prohibiting the replacement of parts in laundry equipment and materials used by hardware and supply houses, thus impairing normal business activity and thereby lessening their paper requirements. Quite an upswing, however, is being experienced in the sale of building and sheathing paper, occasioned to a great extent by seasonal demand.

SIMPLICITY

NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
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U-Bar Barking & Washing Drum
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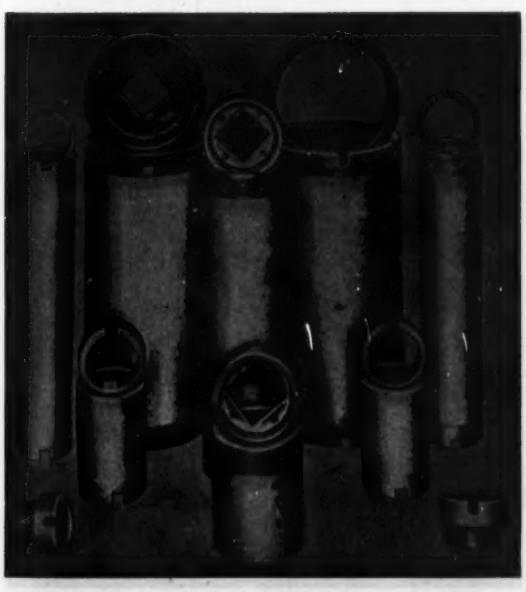
Nekoosa Chip Cutter
F.M.P. Circ. & Ind. Heating System
Coolidge Chip Packer
F.M.P. Coarse Screen & Knotter
Blow Steam Plants
Thune Pressure Filter
Norman Chip Duster
Drammen Blow Valve
Sandberg Diffuser Valve



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CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

CORES

Samples of caps or cores will be gladly submitted

ELIXMAN PAPER CORE COMPANY, INC.

CORINTH, N. Y.

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL
Wednesday, March 25, 1942.

BLANC FIXE—Quotations on blanc fixe are firm and continue unchanged at prevailing market levels. Situation more normal at this date. The pulp is currently quoted at $40 per ton in barrels, at works; the powder is offered at $60 per ton, f.o.b., works.

BLEACHING POWDER—Prices on bleaching powder are firm. Shipments allocated to consumers. Prices stabilized by agreement with OPA. Bleaching powder is currently quoted at $2.25 per 100 pounds, in drums, at works.

CASEIN—Quotations on casein are firm. Demand reported fair for the week. Standard domestic casein, 20-30 mesh, is currently quoted at 22 cents per pound; 80-100 mesh at 22½ cents per pound; all prices in bags, car lots. Standard Argentina casein is currently offered at 18 cents per pound, c.i.f. No quotations on French casein.

CAUSTIC SODA—Prices on caustic soda are reported firm. Demand active for the current week. Solid caustic soda is currently quoted at $2.30 per 100 pounds, flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay are firm and continue unchanged. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay at from $12 to $22 per ton, at mines. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE — Quotations on chlorine unchanged. Amendment to Preference Order M-19 in effect April 1. Chlorine is currently quoted at from $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—Quotations on some grades of rosin are lower for the current week. "G" gum rosin is currently quoted at $2.95 per 100 pounds, in barrels, Savannah "FF" wood rosin is currently quoted at $2.95 per 100 pounds in barrels, New York. Seventy per cent gum rosin size is quoted at $3.31 per 100 pounds, f.o.b., works.

SALT CAKE—Prices on salt cake are firm. Demand steady for the current week. Domestic salt cake is currently quoted at $15 per ton in bulk; chrome salt cake at $16 per ton. All prices in car lots, f.o.b., shipping point. Quotations on imported salt cake are nominal at $16 per ton.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market quotations. Demand reported fair. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch continue unchanged for the current week. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand reported good. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at from $1.75 to $1.85 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Prices of sulphur are firm and continue to conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $18 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $15 to $21 per ton, at mills. No quotations on imported talc.

MARKET QUOTATIONS

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Delivered Zone A			
Northern, Extra Quality	$6.00	@	$7.00
Superstandard	5.25	"	6.25
Northern Standard Wrapping	4.75	"	5.25
Standard Wrapping	4.75	"	—
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.05	"	—
White No. 1½	1.00	"	—
White No. 2	1.00	"	—
Anti-Tarnish M. G.	.95	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.35	"	—
Bleached, Jr.	2.65	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.75	@	10.75
No. 1 Manila Wrapping, 35 lb.	5.50	"	5.75
No. 2 Manila Wrapping, 35 lb.	5.25	"	5.50
Boards, per ton—			
News	*48.00	@	—
Chip	*45.00	"	—
Sgl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*60.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds			Ledgers
100% Rag Ext. No. 1	$40.25	@	$47.25	$41.40 @ $48.50
100% Rag	32.20	"	37.75	33.35 " 39.25
85% Rag	....	"	....	32.20 " 37.75
75% Rag	24.75	"	29.00	25.90 " 30.50
65% Rag	....	"	....	22.80 " 27.75
50% Rag	18.70	"	22.75	19.90 " 24.25
25% Rag	16.40	"	20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds			Ledgers
No. 1	$10.55	@	$12.75	$11.70 @ $14.25
No. 2	9.65	"	11.75	10.80 " 13.25
No. 3	9.20	"	11.25	10.35 " 12.50
No. 4	8.90	"	10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper.

Delivered in Zone 1:

No. 1 Glossy Coated	$13.65	@	$15.50
No. 2 Glossy Coated	12.40	"	14.00
No. 3 Glossy Coated	11.60	"	13.25
No. 4 Glossy Coated	11.15	"	12.75
No. 1 Antique (watermarked)	10.25	"	11.75
No. 2 Offset	9.60	"	11.00
A Grade E. F.	9.35	"	10.75
A Grade S. & S. C.	9.60	"	11.00
B Grade E. F.	8.85	"	10.25
B Grade S. & S. C.	9.10	"	10.50
C Grade E. F.	8.55	"	9.75
C Grade S. & S. C.	8.80	"	10.00
D Grade E. F.	8.25	"	9.50
D Grade S. & S. C.	8.50	"	9.75

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	No prices		
Dry	No prices		
(Delivered)			
No. 1 Domestic and Canadian	40.00	@	43.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	3.62½	@	4.75
Prime Qualities—			
Easy-Bleaching Sulphite	3.17½	"	4.25
Strong Unbleached Sulphite	3.17½	"	4.25
News Grade, delivered			
Unbleached Sulphite	63.75	"	67.75
(On Dock, Atlantic Ports)			
Kraft Bleached	4.12½	"	—
Kraft Light & Strong	No prices		
Kraft No. 1	No prices		
(Delivered)			
Kraft Domestic and Canadian	3.00	"	4.00
(Delivered)			
Soda Bleached	3.30	"	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	8.00	@	8.25
Silesias No. 1	4.50	"	4.75
New Unbleached	8.00	"	8.25
Blue Overall	5.75	"	6.00
Fancy	3.00	"	3.25
Washables	2.50	"	2.75
Mixed Khaki Cuttings	2.50	"	2.75
O. D. Khaki Cuttings	3.00	"	3.15

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
* Old Manila Rope	5.75	"	—

*OPA Maximum Prices.

Foreign Rags

All prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	4.25	@	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40

More than just a TRADE MARK

EXCELSIOR KNOX Woolen Co. Camden Me. FELTS & JACKETS

BUT also a guarantee by men who for 78 years have prided themselves in making finer felts. TO YOU —this is the mark of dependability, longer felt life and greater saving.

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CAMDEN, MAINE.

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35 East Wacker Drive Chicago
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Manufacturers of
ENGLISH FINISH SUPERCALENDERED
MACHINE FINISHED BOOK
and LITHOGRAPHIC PAPERS

Offset, Envelope, Bond, Writing, Mimeograph, Ledger, Eggshell, Cover and Music Papers, Index Bristol, Post Card and Label Papers

HIGH GRADE COATED BOOK

. . . .

KRAFT WRAPPING AND KRAFT ENVELOPE
KRAFT LINER BOARD
BLEACHED SULPHITE AND SODA PULP
BLEACHED AND UNBLEACHED KRAFT PULP

MILLS:
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Jordan Shell and Plug Fillings
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POSITIVE
Reg. U. S. Pat. Off.
High Speed Disc Refiner
THE BAHR BROTHERS MFG. CO.
MARION, INDIANA, U.S.A.

PULP MILL MACH'Y FINISHING ROOM MACH'Y
— FRICTION CLUTCHES —
The MOORE & WHITE Co.
PHILADELPHIA, PA.
N. PHILA. STA. PENNA R.R.
PAPER MILL MACHINERY

FOR VICTORY PRODUCTION No. 20 "GIANT" MULTIPLEX CUTTERS

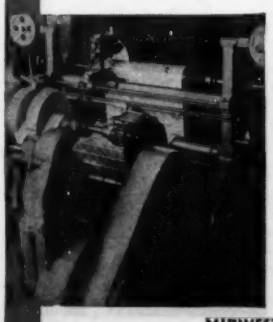
Taylor-Stiles cutters are used by leading paper manufacturers for maximum production, one of several efficient types—

Send for facts about cutter you need.

TAYLOR-STILES & COMPANY
10 Bridge Street Riegelsville, N. J.

We are wondering how we ever got by without it —"

So writes E. A. Bradshaw, of Bradshaw's Limited, Toronto, about a Camachine Electric Eye Side Guide Control, which incorporates also a Camachine Constant Web Tension Control. "Our enthusiasm for the work it is doing increases every day," says Mr. Bradshaw; and that is understandable, for his plant is slitting small wraps which require a very close sidewise register. For precision register, sidewise and lengthwise, on web printing presses —and for accurate, uniformly rewound rolls on slitting and rewinding equipment — the Electric Eye Side Guide Control with Constant Web Tension Control is a money-earner. Write for descriptive literature.



CAMERON MACHINE COMPANY
61 Poplar St., Brooklyn, N. Y.

MIDWEST OFFICE:
Harris Trust Building, 111 West Monroe Street, CHICAGO

CAMACHINE

Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.00	@	4.25
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	4.75
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	4.25	"	4.75
Sisal Strings	3.25	"	3.75
Mixed Strings	.10	"	1.20

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
Mixed Books	1.07½	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	1.75	"	—
Old Corrugated Containers	1.00	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17¼	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila	.26	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1	.07¼	@	.07½
New White No. 2	.04½	"	.05
Light Silesias	.04½	"	.04¾
Silesias, No. 1	.04	"	.04¼
Black Silesias, soft	.03¾	"	.04
New Unbleached	.07¼	"	.07½
Washable Prints	.03¾	"	.03½
Washable No. 1	.02	"	.02¼
Blue Overall	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales	.03¼	"	.03½
New Black Soft	.02¾	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.	.03	"	.03¼
No. 2 Mixed	.02¼	"	.02½
Corduroy	.01¾	"	.02¼
New Canvas	.04¾	"	.05¼
New Black Mixed	—	"	.02½

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
White No. 2—Repacked	2.90	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Sisal Rope	3.75	"	—
Mixed Rope	.75	"	1.00
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila.)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Jute Corrugated Cuttings	.90	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old Corrugated Containers	1.00	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	4.25	@	—
Sisal Rope	4.00	"	4.25
Mixed Rope	1.00	"	1.25
Transmission Rope—			
Foreign	(nominal)		
Domestic	3.50	"	3.75
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	5.25	"	5.50
Jute Carpet Threads	3.25	"	3.50
Bleachery Burlap	8.00	"	8.50
Scrap Burlap—			
Foreign	(nominal)		
Domestic	—	"	4.00
Scrap Sisal	4.00	"	4.25
Scrap Sisal for Shredding	4.25	"	4.50
Wool Tares—			
Foreign	(nominal)		
Domestic	4.25	"	4.50
Aust. Wool Pouches	5.50	"	5.75
New Burlap Cuttings	5.00	"	5.25
Heavy Baling Bagging	5.00	"	5.50
Paper Mill Bagging	3.00	"	3.25
No. 2 Bagging	1.35	"	—

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04¾
Fancy Percales	.04¼	"	.05
New White No. 1	.08	"	.08¼
New Light Flannelettes	.06	"	.06¼
Canton Flannel, Bleached	.08¼	"	.08½
Underwear Cutters, Bleached	.08	"	.08¼
Silesias No. 1	.04½	"	.05
New Black Silesias	.03¾	"	.04
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.08½	"	.08½
Blue Cheviots	.04¼	"	.05
Fancy	.02¾	"	—
Washable	.01¾	"	—
Cottons According to Grades—			
Blue Overalls	—	"	.05½
New Black, Soft	.03¾	"	.04
Khaki Cuttings	.04¼	"	.04½
O. D. Khaki	.04½	"	.04¾
Corduroy	.12	"	—
New Canvas	.06	"	.06½
B. V. D. Cuttings	.07¾	"	.08

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—Repacked	3.80	@	—
Miscellaneous	3.20	"	—
White No. 2—Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—
No. 2	1.45	"	—
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
* Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.50	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 2 Roofing Rags	1.45	"	—

Paper Men Get War Jobs

WASHINGTON, D. C., March 25, 1942—Howard E. Walker, of Chillicothe, Ohio, director and member of the operating committee of the Brunswick Paper and Pulp Company, Brunswick, Ga., has been appointed a consultant of the WPB Paper and Pulp Branch.

Also A. G. Wakeman, operating manager of the Fox River Paper Corporation of Appleton, Wis., has been made consultant of the Paper and Pulp Branch of WPB.

Phillips Dennett, president of the Bird Machine Company, South Walpole, Mass., was also appointed consultant of the same branch.